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**INTRODUCTION**  
**TO THE**  
**Message of the XXth Century**

containing a new method for the systematic interpretation of  
the Vedas, and experimental data proving that  
the Vedas are treatises on the  
**EXACT SCIENCES.**

By  
**Panyam Narayana Coud, M.A., B.Sc. (Edin.)**

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**1920.**

Yajñārthāt karmanō 'nyatra lōkō 'yam  
karma bandhanah, tadartham karma  
Kauntēya muktasaṅgassamâchara.

Bh. Gî. III, 9.

Dêvân bhâvayatâ 'nēna tē dēvâ bhâva-  
yantu vah, parasparam bhâvayanta-  
srēyah paramavâpsyatha.

Bh. Gî. III, 11. (p. 128.)

THESE DISCOVERIES ARE DEDICATED

TO

**The Rev. A. M. TABARD, M.A., M.R.A.S.,**

*Fellow of the Mysore University, President of the Mythic  
Society, as a tribute of admiration and reverence for  
his great love of India and her glorious past.*



PREFACE  
TO THE  
Message of the XXth Century.

**O**UT of the unqualified Existence, the Swayambhû, whose real nature can be apprehended only by severe *tapas*, emanates the massive and concrete Externality, being propelled by the innate Chemical and Physical Agents, which, acting in accordance with the Law of action and reaction, will in due course submerge this manifested Universe into the imperceptible original Existence. This wave-motion is endless since it follows the First Law of Motion, and since there are no external forces either to accelerate or to retard it. At a certain stage in this undulation there arises gross matter with its manifold forms and attributes; and that gradation of it which is characterized with objective intelligence, is termed Humanity, whose primeval stem is known as Prajâpati.

Prajâpati had two wives, Diti and Aditi, by each of whom he had a host of sons and daughters. One day he summoned the progeny together, and spoke to them thus : "Children, I have grown old and may not live to see many summers. I, therefore, want to settle matters with you and between you. My *tapas* is all that I possess and no other treasure is available with me. Tell me what you desire from me. I will forthwith bestow it on you. But, lest you should beg for worthless things, I allow you

a week's time to deeply ponder over it." So saying he dismissed them from his presence.

That day week the sons met again at their father's habitation, but this time they were divided into two groups, the sons of Diti on one side, and the sons of Aditi on the other. Prajâpati enquired as to the cause of the cleavage in their ranks. In answer, the sons of Diti said: "Look here, dad, these your sons are fools and sheer madmen. We cannot understand them, for they speak nonsense. They do not want to enjoy life, rather would they mortify and kill themselves. But if you do not eat your words, give us the power to eat, drink, and be merry wherever we go. We demand it as by right it belongs to us".

"Be it so, ye fools, and begone" angrily uttered the father, when they strolled away dancing in mirth.

Presently the sons of Aditi drew near, and saluting him with all the reverence due to a father, stood still with folded hands. Prajâpati replied: "Sons, pleased am I with your demeanour. Listen to what I say. This body of mine is the source of all wealth, prosperity, and happiness. Dharma, such is its name, is the embodiment of all the *Dévas*. Its members will never fail to act their part; but by their very action they produce phenomena that seem to consume it. At such times I will enter into it from among your hearts and prevent its being mutilated in any way. Therefore, dear children, learn from me the secrets of this Dharma." He instructed them in the secrets of this "*Revelation*"; and when they had mastered all the intricacies, Prajâpati

departed from his universal body to enter the hearts of Aditi's offspring. In those days they could speak to him, live with him, and feel that they were one with him who was in their hearts—the Brahman.

The sons of Diti took the most abrupt leave of their step-brothers, and hastened away casting at them sarcastic looks purporting a great victory; for they believed them fools, indeed, to live solely for a lifeless body. They wandered hither and thither, discovered and invaded new lands, and soon forgot their homes and brothers, being steeped in the ever-changing multifarious worldly enjoyments. But the sons of Aditi were happy in their own homes, for they had vanquished all desire of going out in search of further enjoyments. Among them were men of extraordinary imagination and prudence, who devised and applied the requisite means to prevent the body from internal decay and external aggression. They built two mighty forts, called the *Varna* and *Asrama* Dharmas, one encompassing the other, in order to defend the body. The outer fort, along the whole length of which ran the endless and brilliant chain of desire for emancipation, being made of solid metal was visibly adamant. It contained a system of four defensive ramparts. The Servants lived on the Western, the Commissariat on the Northern, the Soldiery on the Southern, and the General-staff on the Eastern parapets of this citadel.

Thus guarded the stronghold was impregnable to all save those who were bent on renunciation and, consequently, who could pass through all of its labyrin-



thian defences without being either noticed or impeded. This defect, however, was made up by the erection of an inner fortress, generally known as the *Asrama Dharma*, which likewise enclosed a discontinuous chain of unstrainable elasticity, perhaps more brilliant and perfect than that of the former fort. The surprising fact about this fort was that it was invisible and, as such, inaccessible. Those that passed through the external barrier were caught and imprisoned in the Eastern rampart of the inner fort. The other three ramparts—for this one consisted of the same number of them as did the former fort—were in order manned by *Vānaprastas* who kept vigilant watch, *Brahmachārins* who studied the plans and paths, and *Grihastas* who waited for orders and attended to their execution. Notwithstanding these thoughtful arrangements, both the forts had a common defect; and that was that he who is and yet is not, could easily pass through them. It was, indeed, very hard to hit upon a suitable plan that would keep him away from interfering with the body. Much time was spent in thinking, till at last, a voice was heard—the voice of *Prajāpati*—which, in thundering accents, declared that such an one could be none but himself, and that he could not be hindered by any means whatsoever.

With these arrangements the sons of *Aditi* lived in peace and plenty for thousands of years. But alas! Time spares neither the good nor the wicked. Assisted by his two accomplices, *Regeneration* and *Degeneration*, who, like their master, are perfectly impartial, he works unspeakable wonders. This unscrupulous deadly monster,

approaching these two forts whose defects he knew full well, tried with the aid of Degeneration, to rase them to the ground. But the defence was bravely maintained. Yet, the ramparts were tottering, the chains enclosed within the forts were wearing out from day to day, exhaustion manifested in the brains of the generals, and in short all was beyond redemption. The decimated ranks of the inner defences fled hastily to where they had hid the body of their ancestor, but his instructions they could not recollect. Lamentations grew inside as the terrible war raged outside. Amidst these disparaging conditions, a voice, the same voice which was heard before, was heard again. "Sons", it sounded, "it is time that I took possession of my body to relieve your pain. Make no mistake as to the cause of your present misery. It has resulted from the inertia to which this body of Dharma has been subjected. Learn that Time and his accessories have resulted from this very body." No sooner did silence prevail, than the legs began to move, then the thighs, the hands, and the head. Prajâpati was born again. Lo ! a fire, a conflagration ! It rose higher and higher enveloped the earth, planets, stars, and filled all space burning away the dirt and rust occasioned by prolonged activities of monotonous Degradation. As far as ordinary vision went, one could enumerate Krishna, Vyâsa, Arjuna and others, shining brilliantly and dancing cheerfully in the tempering flames. Cheers of victory flew up to the skies. Time, the Destroyer, took to his heels with no hope of revenge. All was steady and orderly ; and the inanimate body lay prostrated once more on the ground.

Nevertheless, the effects of the success were but transitory. Victory, as it ought to have been, was not accompanied by Time, the Regenerator. It left on the stage new actors under new sets of circumstances. Totally foreign to the numerous ways and by-ways of the fortifications, and unacquainted with the processes and methods of profitably utilizing the beneficent body left in their charge, they could not help blundering many a time. Misfortunes seldom visit singly. These new descendants of Aditi, in their turn, had to face the ravages of Time.

It was at a late hour of a disagreeable and chilly winter-evening, and when every one within the forts was fast asleep, that heavy knocking was heard at the gates of the external fort, to the surprise of the few wakeful watchmen in the Southern bulwark of the inner fort. Despite the fact that the function of these watchmen was not to answer such calls, but only to watch, and learn from the watching of the turn of the tides in this existence of ours, their love and sympathy for the stragglers were so strong that they were forced to awaken the Soldiery stationed on the outer fort. In the excitement caused by the sudden manifestation of hostilities, these half-sleepy and half-wakeful Soldiers timidly questioned as to the purpose of the warlike demonstrations. The reply was harsh and highly presumptive: "In the names of Mars and Mohammed we order you to fling open the gates". Its abruptness, its ludicrous nature, and yet its imposing dignity made "confusion worse confounded," and considerably stupified the

defenders. However, recovering from these first effects of a lasting conflict, the sons of Aditi replied : “ What compulsion is that to us ? ” No more words. Declaration of hostilities followed by a severe contest was the result. The freshness, the adventurous spirit, the merciless fanaticism, and the arrogant behaviour of the invaders bought at first a seeming victory over their pious and other worldly-minded opponents. The attack slackened in vigour, the inimical feelings gradually began to wear out, and the fact that the combatants were closely connected with filial bonds, fell heavily on the wise men on either side. Unlike the superficial one of the invaders, it was the lot of the defenders to achieve a promising and lasting conquest. The weapons used for this purpose were the feeling of brotherhood and the understanding of human nature. The terms of peace were contracted ; and the treaty was signed after due production of apology from the strangers.

Here ends the second act in the drama of our National evolution. The third act is still in the making, and it is risky to prophesy. But, however, we may safely recount here a metaphor from the *Purānas* which runs thus :—

Dharma (to Nārāyana) :—“ My Lord, overburdened am I with ignominious burden of such magnitude that *Sésháhi* is tottering with unrhythmic step, tremulously complaining of his incapacity to contain me any longer. *Rākshasas* have dominated, and are working havoc inconceivable. Their assumption that my limbs are not well-formed, is their authority to amputate them one

by one till I am reduced to what you behold. Sire, mine are all ails. Deprived of peace, immersed in agony and maddening grief, have I fled to Thee. Free me, my Lord, from the pangs of this approaching destruction."

Nârâyana :—" Courage ! Lady, take courage. To lose heart on account of irresistible Law is not wisdom. Learn, Lady, that this is the end of the Kaliyuga. War, pestilence, and disease will effect disastrous destruction to secure you relief. Dêvâpi and Marut will incarnate to heal up your wounds. I will follow them and all happiness will be Thine. Adieu ! fair Lady."

Dêvâpi :—" Yes, that is the way 'how the world goes. Children, this Way and this Wise. Would you step into that path when once you walk in This ! Beauty is here. Happiness and peace are in this direction. Sat-Chit-Ânand will you become when you reach this journey's end."

Marut :—" Awake, arise, and stop not till the goal is reached. Brothers follow me this way. Tat twam asi."

Time is ripe now for an attempt to be made by Nature to eliminate the undesirable and propel the indispensable, in order to keep up the "balance of creation" ; and this is the reason why we find that men are born imbued with varying quantities of this reviving potentiality, called Dêvâmsa.

During my sojourn amidst them, I had the fortune to hear a famished and careless wanderer muse within himself thus :—

"Who am I? What is it that I see? How enchanting, beautiful, and lovely is this Western Garden! What is that yonder! Ruins—ruins of mighty forts! Misery, suffering, Death—Death! What art Thou? Thine end where? What powers are there to hold out against Thine almighty grip save knowledge and *tapas*?"

When he heard the song:—

"I know thee as my God and stand apart—I do not know thee as my own and come closer. I know thee as my father and bow before thy feet—I do not grasp thy hand as my friend's,"—he said: "Sweet is the song. Sweeter will it be if practised on the cool and calm heights of the Vedas."

"What are you playing at, my dear children?" quoth he perceiving a busy lot.

Children: "Sire, we want to put our house in proper order, as it was when our forefathers used to play in it."

He: "Very good: dear children, go to the Vedas and you will find the best means of effecting it."

"Child, why doest thou look dejected?" he enquired of another.

"Sire, my brothers have excommunicated me naming me mad on account of my love for the Vedas, wherein, to my ill-luck, I have lost my way and find no escape."

He replied: "Child, wait here for my return, and know me by the name *Vishnuyasa*."

On his way he met a fair lady who greeted him, Welcome Prince.

Vishnuyasa : " Prosperity be thine ! How fares Sambala, Malaya ? "

Malaya : " Sire she has grown mad. Medicine availed her nought. First failed her memory then her physique. She is a wreck, Sire, a complete wreck. Lo ! Listen to her my Lord "—

Sambala sings :—" Indra, Indra, O ! art thou lost  
Despite the says of the past :  
Doom'd am I to live for ever  
Of shame and pain in cover."

Vishnuyasa : " Malaya her affliction has resulted from conception. Mistake it not lest evil should befall thee ! Give her this fruit to eat that she may soon beget Kalki Purusha. Adieu ! "

What is this fruit that would beget Kalki Purusha ? I have essayed in this little volume to unveil its real nature in colloquial language without any attempt at rhetoric, in order that it may be accessible to all interested.

The title " Introduction to the Message of the XXth Century " carries a dual significance. One purpose of this attempt is to give the public at large an idea of the nature and extent of the knowledge, that will in the near future dominate the minds of thoughtful people, while the other is to introduce such of them as have sufficient potentiality and understanding, into the real path, through which their future work might profitably progress.

GOOTY, }  
July 1920. }

P.N.G.

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# Introduction

## TO THE

# Message of the XXth Century.

### CHAPTER I.

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#### OUR HERITAGE: CAUSES WHICH HAVE LED TO ITS MISINTERPRETATION.

**T**HE subject—Its ordinary phase—Its extra-ordinary phase, the Vedas—The necessity to study this subject—What are the Vedas?—The defects of the present Linguistic method of investigation—The dangers of overlooking tradition—Two kinds of traditional lore—Misinterpretation of History has been a cause of misunderstanding the Vedas—Lack of faith and imagination on the part of the investigators—Want of Scientist-workers had indefinitely set off the true interpretation of the Vedas—The drawbacks of the mediæval commentators—The elasticity and flexibility of Samskrit are not its defects, but its virtues—The intrinsic merits of the various methods of Vedic interpretation—The “Agrouchada-Parikshai” on the proper interpretation of the Vedas—The grounds on which the Scientific method of investigation is justified—Dharma is equivalent to Natural Law—The Veda is the record of the facts and principles of the Physical Sciences.

That subject which stands in all its solitary glory aloof from the rest of the incongruous material ; that which, being

by its very nature of supreme importance, demands the special attention of the thoughtful people; that whose meagre investigators have lost their way, and have either purposely misconstrued it or explained and advocated it sincerely but unfortunately in a misconceived way; that which, when fully understood, would give us complete self-consciousness with the consequent self-realization, the highest development of human intelligence and intuitive perception; that which we are proud to title our Heritage:—such is the subject matter of the succeeding pages. That little of it which has been understood in this age, has been the solace and guidance of the thinking humanity. The life and progress of our society, nay, of humanity itself, seem to depend entirely on this understanding; and until it be understood in full, Kritayuga Dharma cannot be reestablished in these terrestrial regions. It is, therefore, a pressing call on every Bhāratīya to deeply concentrate his mind over this subject and strive with might and main to revive it.

All that we inherit from our ancestors is our Heritage. It exists in two phases, the ordinary, and the extraordinary. The former, relating to the gift of Nature, is too well known to require further exposition. Max Müller, an eminent Orientalist of the last century, says thus: "If I were to look over the whole world to find out the country most richly endowed with all the wealth, power, and beauty that Nature can bestow—in some parts a very paradise on earth—I should point to India."\* Yet, it must be admitted that none has completely grasped the invaluable assistance rendered by this beautiful gift of Nature, towards the development of the Indian thought as embodied in the Vedas and Upanishads. The lofty mountains of Northern India, with their silvery

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\* "India; what can it teach us?"

peaks and projections, giving birth to the mythological personages such as *Pārvati* and *Nāgās* ; the vast and extensive landscapes of Hindustān, with their fertile and captivating fields of diverse tints, reminding us of the Unity in Diversity of manifestation; the long and bulky rivers with their impetuous and boisterous progeny, and the inspiring and gorgeous cataracts and waterfalls, making us conscious of the Eternal Cyclic Flow; and the diverse shades of climate existing in this time-honoured land, are the direct agents that should be calculated to have stirred up the imagination of our ancients, and goaded it with the burning desire of acquiring universal knowledge. The bright and calm atmosphere, with its brilliant sun and merciful moon, revealed to them a world of beauty and order, the world of stars. In it they saw the *Mēru* with its memorable inhabitants, the *Devas*, playing with, and helping one another in their "fights" against, the *Asuras*, the records of which are left to us in the form of the *Vedas*.

The reverence to and worship of Nature which prevailed in "prehistoric" India, are not, as generally supposed, the same as those exacted ones which accompany brutality and punishment. They are full of ethical sentiment and resigning attitude, which are the never failing adjuncts of deep knowledge and self-consciousness: hence is the intimacy between Nature and the *Rishis* very illuminatingly depicted in the Hindu *Purāṇic* lore.

However much valuable and desirable this branch of our Heritage may be, it is only of secondary importance to the Hindu in so far as it is subject to the change common to all manifested things in the cyclic continuity of Time and perpetual succession of conditions. The political and social environments under which a nation has been accustomed to live

and thrive, are often modified by physical disturbances taking place in the society. Nor should we forget the imperceptible workings of Nature, bringing about sudden and violent changes, to prevent which ordinary human skill and knowledge are decidedly insufficient, and sometimes improper, too. In the light of this truism the *Rishis* were not content with bequeathing to us merely what was transitory, apparent, and practically useless. They looked for something substantial, even as we at present do, and during their search they discovered a changeless and ever-increasing wealth, the wealth which is herein called the extraordinary phase of our Heritage.

Nations have flourished and lived in peace, harmony, and happiness, but few have survived the decadence wrought upon them by Time. What, then, has made India live as contented and happy as ever, even in these depths of degradation and despair? What is that which has nourished our lives with hope, armed us with presence of mind in spite of distressing calamities, and often galvanized our passive society into high activity? To serve which purpose have we been preserved?

In villages and in places whither the "Modern Civilization" has not yet spread its pestilential influence of crushing all indigenous institutions, there exists to this day a highly commendable method of home education generally undertaken by the old members of a family, who, at sunset and in moonlit nights, when the refreshing breeze gently passes over the party healing up the effects of the day's hard toil, make it a point to narrate to youngsters unrecorded stories of diverse morals and ideals, with a view to solace and pacify their hearts and instil into them hope and righteous ambition. A very common one of such stories is that of an accomplished *Rākshasa*, who is favoured with immunity from all danger.

His life is embodied, it says, in a lustrous parrot, which is cooped in a golden cage guarded by valient giants and hidden in Pâtāla, access to which is a practical impossibility. One may dissect the body of the giant into pieces, but the very next moment he will appear as unhurt as ever. The Hindus have been trampled down by successive invaders some of whom attempted at their very lives. Still they survive. They get up again and again and resist. They ultimately succeed in enforcing terms on the enemy—and all this in virtue of the hope beyond hope derived from the extraordinary phase of the Heritage.

Passing on to this branch, all that need be said at this stage is that it is given to us in the form of systematized experience and crystallized thought, the results of patient research of many long centuries, which are honoured by us for their unique character and “strong intellectuality, at once austere and rich, robust and minute, powerful and delicate, massive in principle and curious in detail.” What we have inherited is imperishable since it is a record in the main of the Principles of Nature with the resulting dominant spirituality, which incite us to “an inexhaustible vital creativeness and gust of life,” and train us to regulate them by “a powerful, penetrating and scrupulous intelligence, combined of the rational, ethical and æsthetic mind each at a high intensity of action.” To secure its permanent existence in our minds, the grandest possible organization has been set in motion. Despite the devastations of Time, the meaningful dicta of the Brâhminical organization have enabled us to realize the true significance of those sayings or writings even at the present time, when to our utter lamentation the esoteric significance of their contents, has completely perished owing to the want of suitable exponents and interested students. Herein lie the

value and necessity for this unique organization but for whose presence the Vedas, in all probability, would not have been handed down to us. As these Vedas take due account of and provide for the three "Gunas" of Prakriti, this portion of our Heritage has to be subdivided into three main groups: namely, the spiritual, social, and material Dharmas, according as the subject matter dealt with is of the nature of Satwa, Rajas and Tamas, generating in us the feelings leading up to Universalism, Nationalism, and Individualism respectively.

Than the fact that the *Rishis*, the original proprietors of this knowledge, were staunch humanitarians, we require no other proof of the statement that only next to nothing has been left to be classified under material Dharma; and unless we erroneously consider this Dharma to represent the proper application of the Principles of Nature, in which case it draws into itself a great part of the sacred literature of the Hindus, the statement remains unchallenged. Is the present Western civilization termed materialistic only because scientific discovery and its application are at its basis? Not in the least. What we actually mean, when we declare that the Western nations have a material civilization, is that they are immersed from top to toe in matter and its uses, that they do not possess the patience and interest to think of the invaluable inner Self, and that they make use of Science and the power given to them by Science in a most voluptuous and unsedate manner. It is unsafe to classify that which forms the immediate basis of social and spiritual Dharmas of the Hindus under the other dealing with objects, agents, and ideas which are full of inertia and ignorance. This is the reason why we have very little of either the literature or institutions of an out and out materialistic character in India.

The religious significance of even the minor customs of the Hindus testifies to this. There is in fact nothing, however trivial, in Hindu life that is not of spiritual interest.

Of the spiritual and social Dharmas, the literature of the former is more voluminous and weighty than that of the latter. The one consists of the four Vedas and the various branches of philosophy, and institutions of the type of the four *Āśramas*, while the other is represented by the *Purānas* and *Dharmasāstras*, and the organization of the four *Varnas*. We have no logical support to call this social Dharma a resultant of a material civilization, inasmuch as the laws advocated by its originators are the rational extensions of the intrinsic Truths of Nature, so moulded as to allow their being applied to the members of human societies, with a view to lead them up to a higher spiritual life than what human instinct provides them with. The social laws prevailing in Western countries, being the outcome of a scrupulously conventional and commercial outlook, cannot be explained away in a similar manner; for the Western Nations have not yet attained the Sātwika phase, that is, the complete mastery of the Laws of Nature. But the Rishis had passed through this stage as is evinced by the Vedas.

The study of this subject is made imperative during the present times by the impelling forces of universal wave-motion, which is the governing principle of all Natural phenomena. Owing to the continuity of Time and Space and Ether, every cause has an effect which effect becomes the cause of another and so on *ad infinitum*. The chief of the immediate causes which have pushed us to this bent of mind, are, to recount only two, our contact with the Western world with the consequent conflict between our and foreign ideals, and the approaching unavoidable triumph of the superior



ancient Hindu ideal of Unity in Diversity over the foreign one of selfish aggrandizement. All that glitters is not gold: and yet humanity rushes after all that glitters. The Occidentals, priding over the immediate results of their material civilization, have flung at us taunts and insults and have, by the exhibition of their pomp and glitter, attempted to lull us into fancied admiration of their superior powers and original achievements. They have charged us with primitiveness and lack of a becoming civilization. But our tradition has refused successfully to submit to these condemnatory proclamations. Instinctively the Hindu feels that his is the superior civilization. He believes that the Westerners are yet childish in character, naughtily trying to get at everything that chances to fall within their view. He judges them from the dignified position of a grandfather, who merely nods his head at the mischief of his grandchild. But the child is not an ordinary one. It has grown up to be able to speak, and, in its natural curiosity, it challenges this resigned man of the old world to perform the magnificent feats that are performed by itself; and in case he merely laughs at this manifestation of ignorance, it calls him old, imbecile, and primitive. The impetuosity of this ridicule has become unbearable even to this old man who had renounced all worldly concerns, and has forced him to think whether he had really performed these feats during his childhood. He has gradually cleared his memory of high and altruistic motives and begun to recollect his past. Lo! in doing so he himself has become a child. The instincts of a child have revived in him, and he has shaped his environments to resemble those of a child. Partly to his astonishment and partly to his satisfaction, he has discovered that his so-called old methods and primitive ways, have semblences of and

origin in the methods and ways of the demouring child. He has, therefore, set himself to the task of demonstrating his ancient methods to the now-bewildered child with the hope that it may bring round its wayward character. In fine, the ancient dynamic Hinduism has once again become "aggressive", making the study of our Heritage imperative during the present times.

When we focus our mental vision over the polished sheet of this subject in the light of this metamorphosis, we obtain a most amazing picture reflected from it. We find the juvenile ancient Bharatavarsha with her "stupendous vitality, her inexhaustible power of life and joy of life, her almost unimaginably prolific creativeness. For three thousand years at least—it is indeed much longer—she has been creating abundantly and incessantly, lavishly, with an inexhaustible manysidedness, republics and kingdoms and empires, philosophies and cosmogonies and sciences, and creeds and arts and poems, and all kinds of monuments and palaces and temples and public works, communities and societies and religious orders, laws and codes and rituals, physical sciences, psychic sciences, systems of yoga, systems of politics and administration, arts spiritual, arts worldly, trades, industries, fine crafts—the list is endless and in each item there is almost a plethora of activity." \*

The phrase our Heritage does not signify that of the Hindus alone but that of the whole humanity, since it was intended for all by the *Rishis*, the ancestors of humanity. The reasons to make it our common property are simple and obvious. The most superficial perusal of their works will suffice to convince any sane person of their indomitable will, almost unequalled intellectual perfection, and laudable

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\* Aravinda Ghose—"Arya."

humanitarianism. To do them justice, we must admit that their mental acumen has not been equalled by that of even the most advanced scientific thinkers of modern times. What has been achieved by them in a material form, is a long way from the most imaginary mental visions of the forerunners of the present "advanced civilization." Indeed, the proper understanding of our Heritage would put us to a lasting shame, which would become all the more unbearable when we remember that we have been bombastic in the reiterated proclamations of our superiority to its original possessors. In our assumed capacity of an all-knowing judge, that ill-suits them most who are totally foreign to the method of thinking adopted by the ancients, who were guided by universal love and sympathy, we have done a great injustice by way of belittling their worth beyond our capacity of filing a defence of our innocence. This ends not here. The injustice is against Nature itself with which the sages identified themselves, and which, as scientific investigation points out, is the source of all power and retribution. *Agni, Indra, Maruts, Rudras* and others are nothing if not the Agents of Nature, with whose help the ancients used to defend their hearths and homes, and obtain certain knowledge respecting the workings of Nature. Alas! to decry the Vedas, "the source of Being and non-Being," in order to satisfy the insatiable and revolting feeling of presumptuous "advanced civilization"!

But what are the Vedas? Nobody seems to have grasped the clue to them, though many have spent much time and energy over them; for what does it avail if we labour hard in a diamond mine without the proper implements to detect them. He who is good in himself would like to find out the good of others; but he who is not so would find

everything as bad. But, perhaps, what our commentators have done, though harmful to the extremity of stamping out our faith in the Vedas, was not deliberately intended to be such. It is to the paucity of sympathy and discernment on their part that this misunderstanding is due. It was strengthened by their inherited prejudices and enhanced by the insufficient knowledge of the Laws of Nature. That they have mistaken them for something which they do not represent is a fact, but that it could not have been otherwise is also a fact, the truth of which becomes evident after a perusal of the following pages.

Of the various qualifications that are essential for the proper understanding of the Vedas, only two, that of simple curiosity and that of philological training, are to be discovered in the modern interpreters of the Vedas ; but even these are far from being adequately developed. Sympathy with, and faith in, what is said about and in these works, are entirely wanting. This is their fundamental error inasmuch as it is specially enjoined that lack of *sraddha* and *bhakti*, that is, interest and faith, will lead the way astray even after the right track has been scented. Next in sequence comes the proficiency in the six *Vedāṅgas* and *sūtras*, not possessing which the study of the Vedas is as good as running after the mirage to quench our thirst with. The third accessory is the ability to critically evaluate the *Purāṇas* and *Dharmasāstras*, which are partly the refracted images of the Vedas, the rays having been propagated through the dense and deep medium of Vyāsa. The want of this discriminating faculty is an additional disqualification to their already misguided intellect, which, as is attested by the records they have left, can be seen stumbling at every step irrespective of its stability or frailty. Besides, there are other necessities lacking such as, the

application of experimental tests, and the traditional teaching of the Guru providing them with the true meaning of words and sentences occurring in the Vedic Literature.

Other achievements have taken their place. Instead of with the ordinary scientific scepticism, their minds have been filled to the brim with the disastrous presumption of cultural and racial superiority. Instead of being impartial investigators, they have been reading uncalled for and untenable meanings into these works. And instead of proclaiming to the world their own innocent incapacity to explain them, they have been attempting to tomtom the alleged property of the Vedas to be nothing but the songs of nomadic barbarians, living in semi-cultivated fields, and beseeching the one or the other of the imaginary deities to help them in killing their equally contemptible enemies, the Dravidians!

Max Müller, than whom probably no better champion of the cause of the Linguistic method of oriental research can be found, makes the caustic remarks that "that the Veda is full of childish, silly, even to our minds monstrous conceptions, who would deny?" and that "I do not claim for the ancient Indian Literature any more than I should willingly concede to the fables and traditions and songs of savage nations such as we can study at present in what we call a state of nature."<sup>\*</sup> The presumptive reasoning and curious logic adopted by the advocates of this doctrine to arrive at the foregoing decision, easily captivate the minds of the "Neo-Indians." But on the truly Indian mind they exercise no such enslaving potency. The Indian who is well versed in the labyrinthian paths of the sacred literature of his own country, and is fully acquainted with the peculiar traits of the

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\* "India; what can it teach us?"

ancient civilization of Bharatavarsha, at first finds himself in a perplexing dilemma when he reads these judgments side by side with those of his revered *Rishis*. After careful thought, however, he finds that the argument of the European experts, who suffer from an excessive want of faith in human ability, lacks the force of conviction and experimental attestation, and is characterised by recurring doubts. He further discovers that the modern critics, albeit possessing ever so great claims to erudition and being ever so conversant with Samskrit and its literature, lack the key to the thousand and one mysteries of the secret doctrine and philosophy of the ancient Bhāratīyas. His feeling is different, however, with respect to the remarks made by the ancient *Rishis*, who declare that the Vedas are scientific works. He knows that their reasoning is laboured with the utmost diligence and characterised with personal satisfaction arising from an actual realization of the expectations raised by the Vedic *Yajñas*, in whose performance they had gladly spent their lives.

Since it is incumbent on every true critic to lay bare the glaring shortcomings of the investigators, notwithstanding their high authority and acknowledged scholarship, it is here proposed to deal with the discrepancies in the present methods of Vedic research, before the actual subject matter that forms the body of this volume is taken up. This, however, should not be mistaken to arise out of a spirit of spite and retaliation; but, on the other hand, it would be doing bare justice to the momentous subject under investigation. The deference which we have been accustomed to show to the opinions of scholars like Max Müller, does not by itself create a prerogative on their behalf pleading that they cannot have erred. No one, however, can be more grateful to these critics than ourselves for the invaluable assistance

rendered by their own writings in enabling us to record here some of their drawbacks, with a view to chalk out what to us seems to be the real path in which Vedic research should progress.

At the outset it should be noted that the majority of modern interpreters are foreigners, who are trained to take pride in shunning the ancient "barbaric" Hindu on account of his supposed "primitiveness, ignorance, etc.," with the result that their interpretation cannot but be mechanical and artificial. The conditions of their life are directly at variance with those of the Hindus. They are born in a country whose physical geography differs widely from ours, and are bred up under a civilization which invariably seeks to undermine ours. They have very little of ancient tradition of their own, and, consequently, are not free from the feeling that others too, had as little as they themselves possess. Not being trained to interpret tradition, they find themselves in a very unenviable position, when they are confronted with it. They therefore discredit all tradition and would not countenance it as part of evidence. By doing so they often go against the tradition and experience of the people, and thus provoke the righteous indignation of sensible and self-respecting Hindu, who, being intimately connected with the peculiar traits and principles of his own civilization, should naturally be credited with knowing, to say the least, better than our modern European commentators.

Tradition is an indispensable entity in the truly national History of any great people, which should on no account be neglected. Records of events and facts, whether historical or otherwise, are best preserved, when they are chiselled in the national mind. Books and other artificial devices will last but as long as the political and social conditions remain

favourable to their growth and solidarity. A change in the political life of a nation may easily demolish all its highly priced historical and other literature in the course of a few months or years, as has been amply attested in the case of Egypt and also of India. But tradition carried in the minds of the leaders of the nation defies these devastating changes. It lasts as long as there is inspiration and love in the hearts of the enlightened members of the society; and, when these fail, it becomes a meaningless custom or an unintelligible myth, but in no case will it be erased from the minds of the public in general, chiefly owing to the conservatism of the human mind.

“If there are counterfeits, somewhere there must have been a genuine original.” Human mind cannot form ideas and concepts without an actual something around which they can be woven as a net. Even imagination is not completely devoid of a certain foundation in fact. In it analogy and comparison play a prominent part. Tradition, then, must have some substantial basis. But to the Hindu his tradition is not one of some substantiality, but it is the whole substantiality; because he does not and has not interfered with the teachings of his ancients, whom he reveres as the very incarnation of the Almighty himself. He is conscious of his present deteriorated condition, feels bitterly for his current helplessness, laments day and night for his inability to understand what his ancestors had preached, and above all he feels his own littleness to such an extent that he dare not even think of altering the form of expression in which the traditional knowledge is couched, however indecorous and barbarous it may sound. If he did, there was the fear of an end to his very career from the concentrated effort of a chagrined society.



But what the Hindu commentator has actually done, and for which he must be held responsible, is to misunderstand the traditions. Their inner meaning having been lost, they have become mere myths and figures of speech. But this ought not to be the reason why our modern interpreters should assume that all traditions connected with Hindu history and Hindu life, are bubbles on the wavy surface of Hindu credulousness, which may be blown out at any moment by the mere offhand remark that they are not based on historical facts. Apart from the visible ludicrousness of this supposition, it may be suggested that none who is not brought up according to the precepts of Hindu civilization, should ever think of explaining the traditional documents of the Hindus. There is an impassable gulf between the mentality and outlook of a Hindu and those of a European. The former is, in the majority of cases, resigned, contented, and looking towards within; whereas the latter is always restless, never contented, given to sensual pursuits, and running after the external manifestation. How then can we grant that the latter can understand the former? Even if we assume that he sincerely attempts to understand, would it not be directed only to rebuke and revile him since he feels himself secure in his surroundings, and since he feels that his path is the truest way to happiness and peace? We are witnessing, we are in fact undergoing punishment for it, that even the Hindus, who are in constant touch with the works containing these traditions, are unable to realize their significance in full. Can a European decipher them because he is a European, and is, therefore, tentatively taken to know better than a well trained Hindu?

By this method of revoking all tradition we are, instead of clearing the ground for its proper understanding, striking

at its very root. We are, further, giving a misinterpretation of what rests on tradition. It must be admitted, however, that there are some changes, due to omissions and commissions, which can be explained once we are on the track of the hidden purpose of the tradition ; but they do not in any way diminish the intrinsic value of a certain tradition.

Hindu traditions, as we possess them now, may be divided into two main branches, differing from each other both in point of time and in the historical actuality connected with them. If History were understood in the sense in which the Hindu takes it, that History is the record of all that is precious and good in a nation which should be preserved for the coming generations, then the difference vanishes. But, when we distinguish History to represent only that part which deals with the physical activities of a people, then surely the difference becomes insurmountable. Of course, one part of Hindu tradition is what corresponds to the last definition of History, and it is lesser in extent than the other. But what is this other? When certain individuals had undertaken to shape the destinies of the nation by engineering grand schemes resulting in physical adjustments, what were certain others doing? Even in this present world-war\* we find some Scientists working silently but steadily in the secluded laboratories and inspiring shrines of knowledge, while their brethren are dying in hundreds of thousands in the fields. Despite the great turmoil and din taking place at their very doors, they are not drawn away from their cherished pursuit. Do they not aid to form History? Should not History record their activities? Hindu tradition does more than this. It embodies in itself the

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\* Written during the early part of 1918.

History of the activities of the *Devas*, the Agents of Nature,—the chemical reagents and physical energies,—in whose study the *Rishis* were engaged in much the same way as are the modern Scientists. Mythological traditions, such as *Indra* killing *Vritra* by means of his foam-smeared *Vajradyudha*, are of that stamp. They are not historical facts in the spirit in which the moderners are accustomed to view History. Nevertheless, they have more reality than any historical fact, inasmuch as they are the changeless phenomena of majestic Nature recorded by the *Rishis* in the language of Nature itself.

How does the mediæval Hindu commentator compare with the modern Orientalist? Rightly did the former believe in the sacredness of the texts of the mythical traditions with which he was dealing. By sacredness he understood an immutability, omnipotence, and omniscience as strong as those of the Laws of Nature. Nay more. He went still further and said that “though the sun may fail to rise in the East,” “though fire becomes cold to the touch”, the Vedic text will still be as authoritative as at any other time. Naturally the Guru, who supported these views, would be the last to allow his *Sishya* to use his own imagination or even intuitive perception to effect a change either in the text itself or in the process of its interpretation. But there was a single unavoidable evil—if evil we must call it—in this organization of Guru and *Sishya*. It was that of a division into esoteric and exoteric circles. This division, which is being despised outwardly by the present-day Scientists and Democrats, will be found indispensable as scientific research progresses to such an extent as to provide a single individual with sufficient power to defy a whole nation or a whole society and keep it in perpetual tutelage. In order, therefore, to prevent the

frequent occurrence of this mishap, the *Rishis* of yore were driven to the necessity of differentiating the two grades, of which only those admitted into the esoteric circle obtained the privilege of knowing the secret meaning of the whole tradition. Necessarily the adepts were few in numbers, and the whole nation was guided by them. Under this system of the utmost test and trial, who would dare to maintain that the *Guru* and *Sishya* behaved corruptly enough to seriously interfere with the traditional knowledge?

But, instead, the Hindu commentator, whether he understood it or not, was always making use of it to explain any difficulty; so that by this his act he has preserved for us the traditional lore, if he has done nothing else. But the modern Vedic scholar, who little cares to understand either the value of tradition or the method of its correct interpretation, is forced by the sheer pressure of the mental atmosphere in which he is engulfed, to not only neglect its bearing, but expressly deny its authenticity. To him there can be no sacredness, not even the sacredness of immemorial time.

This undermining of traditional erudition is mostly the result of a false understanding of what History is. The majority of our scholars are satisfied with the definition that History is the chronological record of national deeds with all the incidental effects on other nations. But there are also others who narrow their view so much so that they consider History mainly by the light of political changes and events, neglecting the social and religious forces, which are all the time working silently to produce the political conditions. But the true sense in which History should be taken is, as Max Müller observes, that it is "something really worth knowing, far more so than the Scandals of Courts, or the butcheries of nations, which fill so

many pages of our Manuals of History. All this work is only beginning and whoever likes to labour in these the most ancient of historical archives will find plenty of discoveries to make—and yet people ask what is the use of learning Samskrit?" The history of India is the history of the few and great who stand out as the representatives of the whole nation. They live for the ideal of the nation putting it into practice in their daily life. They live to uplift the nation by punishing the internal and external usurper, whose main endeavour is directed towards the frustration of their plans for the improvement and well-being of the society. Their honour is the honour, their success is the success of the country.

Most of these national heroes lived in the most natural simplicity verging on, if not completely established within, the border of renunciation. They have implanted in the society an ideal of the highest grandeur, and in consequence the history of the Hindu nation cannot be other than a fight between ideals—between Dharma and Adharma, resulting in the ultimate supersession of Dharma over Adharma. Transitory attainments such as wealth, power, and material prosperity are secondary factors in Hindu life. How then can what we possess of Hindu history conform to the canons of modern historical criticisms? And this is the reason why our Samskrit scholars deduce, with a feeling of happy success, that the Hindus had not a method of historical record, and that their historical past is broken up by successive gaps of varying duration.

This illusory decision has been the cause of a further misunderstanding of the Vedic and other ancient literature, thereby enhancing the illogical nature of the present method of Vedic research.

The next fallacy which has misled the primitive Vedic scholars is the apparently established theory, that since the day when man made his first appearance on this planet in the course of natural evolution, this is the first time when true scientific knowledge has dawned on him. The Occidentals deny that there ever was a stage in human development comparable to the present one, possessing all the scientific knowledge that we claim to own in this twentieth century. One may very well ask the questions with the certainty that they cannot be answered in the affirmative to the satisfaction of the truly scientific instinct of man, that for the past millions of years what was the position that man occupied; was he barbarous and brute-like all the time; and is it only within three or four centuries—a trivial duration compared to his long barbarous state—that he was able to master the Laws of Nature and become civilized? Aye, it is astounding to think that that man who led the life of a beast in the forest for at least a few million years could all on a sudden become the highest philosopher! It may be urged that the change is gradual and not sudden. But this is a fallacious statement. The worst stage of barbarism that human mind can conceive of, is not beyond the range of the objective memory of our evolutionists; and to assert that during the intervening millions of years the human race lived as one with the beasts is highly supposititious.

Max Müller, than whom perhaps no better authority is available in matters of antiquarian study connected with Oriental literature, rightly expresses himself thus: "Many things are still unintelligible to us, and the hieroglyphic language of antiquity records but half of the mind's unconscious intentions. Yet more and more the image of man, in whatever clime we meet him, rises before us, noble and pure

from the very beginning ; even his error we learn to understand, even his dreams we begin to interpret. As far as we can trace back the footsteps of man, even on the lowest strata of history, we see the divine gift of a sound and sober intellect belonging to him from the very first, and the idea of a humanity emerging slowly from the depths of an animal brutality can never be maintained again."\*

The real solution, therefore, lies in understanding that human societies are subject to the universal Law of action and reaction which takes them successively through the recurring stages of advancement and degradation.

The lack of vivid imagination and animated faith and interest on the part of the primitive Vedic researchers is astounding more than anything else. In spite of repeated declaration, in the Vedas themselves, of the injunctions that a material and feasible sense should be given to the words used in them,—the same as in use in the scientific literature,—that the Vedas are the source of practical results productive of happiness and peace of mind, and that they deal only with the phenomenal universe, our scholars have one and all failed to duly respect them. Although the etymological meaning of the synonyms of the names of the various *Devatas*, gives them an intelligible material individuality, signifying common objects in Natural Sciences, as contrary to something supernatural or mental abstraction, yet the investigators have neglected it and sometimes have purposely avoided it. It appears that they have not spent any thought whatsoever to consider what may be the purpose of a number of grammatical forms and requisitions, such as the dual form, which appear to the modern man to be

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\* " Chips from a German workshop." Vol. II. p. 7. " Comparative Mythology."

of no practical use ; why one and the same word should carry opposite meanings ; why the codified genders of many Samskrit words do not correspond to our ideas of masculine, feminine and neuter nouns ; why there should be in the Vedas the excessive use of the Historic present tense, just as in our scientific books ; and why the methodicity so glaringly manifest in the Vedas should have been scrupulously adhered to. More than anything else they have ignored the purpose of the *Yajñas*, and are content with thinking that they are something primitive, and, therefore, not worth the trouble of investigation.

Independently of these reasons, there are other important inferences which undoubtedly establish the admitted failure of the present methods of Vedic research. The Vedas, as will be shown in the sequel, are scientific treatises. The scholars who have been explaining them hitherto were anything but Scientists. We cannot expect a Professor of History or of Languages to explain scientific facts. Moreover scientific knowledge had not developed at the beginning of the nineteenth century to the extent we now possess. The insufficient experience, conceit, and probably lack of time of the Scientists did not allow them to be associated with the Vedic research. And we should not expect a better result at the hands of the Hindu, the owner of the Vedas. He is so degraded and demoralized that he has not only forgotten the value of the treasure contained in them, but also is himself questioning their authenticity and authority, and indulging in their vilification. The *Brāhmaṇa*, to whose exclusive trust they were entrusted has ignominiously renounced them together with his *Brāhmaṇahood*, and has taken to the meanness of servitude and beggary. He has committed an unpardonable



sin for which no punishment can be deemed to be adequate. But, fortunately for him, he comes forward with the plea that it is the work of Time. Thrown into background, therefore, and subjected to a merciless denouncement, the Vedas have been dying a tardy death. At this stage the generous European expert comes on the scene, and in the name of humanitarianism! ordains that their lingering life must be extinguished soon lest it should polute his cherished conception of "perpetual evolution."

The mediæval Indian commentators are no less devoid of failures than our expert contemporary critics, though they may effectively take shelter in the ignorance and illusion characteristic of their age. Limitations, often insurmountable, characterize their interpretations. Their explanations in many places are not satisfactory. They leave words and sometimes sentences unexplained, because the latter deal with the scientific technics, which they cannot be expected to decipher situated as they were in an atmosphere of nescience. As even with our enlightened outlook we have miserably failed to make out the inner meaning of the Vedic texts, how much more difficult should it have been for them to explain scientific facts without knowing what the Exact Sciences are? They have not manifested any originality, and there could have been no scope for such a course. They blindly follow their predecessor's example and thus repeat many mistakes and sometimes blunders, too. They have not personally performed the *Yajñas* in whose connection only have the *mantras* any meaning.

The commentators of both the mediæval and modern times have displayed their stupendous ignorance of the psychology of the ancient Hindus. To understand the physical as well as the mental activities of great men of any

age, is within the reach of only the expert introspective and interpretative observers. Few, if any, of our commentators have been fully gifted with these powers. Struck by the general philosophical outlook of the Hindu mind, their pioneers have unwittingly recorded their unshaken belief in the speculative character of all Hindu thought and action and spirit. Those who followed in the wake of these primitive investigators of Samskrit literature, could but discern only such objects as were revealed by the light shed from them; and the Hindu, inspite of an innate hankering for a change in the "angle of vision," had to be content with what had been credited to his ancestors. Thus it was that the commentators were not necessiated to equip themselves with a knowledge of the workings of the human mind. We would be the last to charge them with the ignorance of the fact that this knowledge is of service to those who have to deal with the study of moral and intellectual problems and needs of people very unlike themselves. But, unfortunately, it is not true that they expected to find anything better than the bables of children, and primitive civilization in the literature in which they were toiling hard. Consequently, they were often hampered and dismayed in their attempt at understanding the ancient metaphor and myth. The symbolism, the nomenclature, and the organized method of representation adopted by the *Rishis* have not a whit surrendered their adamant integrity to the passing criticisms of these half-hearted and half-equipped toilers. In short, the study of Samskrit literature has up to the present day successfully defied their sporadic intrusions.

There are some amongst us who prefer an old commentary to a rational but only a new one, on the plea that the older generations knew tradition much better than we do. To

say the least, this is nothing short of bigotry and dogmatism. Commentary is after all not an authority but, at best, an indirect assistance. When the commentator goes against the rules of grammar and common sense and logical reasoning as well, there is no reason why we should not reject his authority. When he, neglecting the obvious injunction that we must look for an inner meaning, looks for the superficial one, what prevents us from declaring that his method is an unmeaning, and valueless routine?

Besides, truth is an eternal and universal verity. If our commentator was right in his understanding of the Vedic hymns, we cannot possibly derive a separate meaning—it should be noted that it is, unlike the other, a connected and persistent meaning—from the same materials. The fact that he has failed to obtain the results enumerated in the Vedas as consequent on the performance of certain *Yajñas*, proves beyond doubt the inadequacy of his explanation. Whereas our method ignoring ignorance does give us practical results, which justify the veneration that we are accustomed to instinctively accord to the Vedas, and which have inspired glowing eulogies in the hearts of the ancients.

No object will be served by urging that the Samskrit language is so elastic and flexible as to give rise to more than one meaning. That a language should be flexible and elastic is one of its virtues, not a defect. Undoubtedly this potentiality of Samskrit has done a great service to humanity, by way of preserving the Vedas from the peril of inevitable disruption that would have attended them, in case they had resembled works written in any other language, which could not *appear* to convey a surface meaning different from what they really contain; for when the select knowledge that would make the true meaning intelligible vanishes from the mind of the

society, the works in question would be worse than useless, and would thereby receive a death-knell in an incredibly short time. The word Samskrit itself informs us that it is not the original language, but the scientifically reformed from of an original one. The reformation of the language was found indispensable, at the time when the Vedās were composed, inasmuch as without such scientific reorganization, it was clear that the grand Truths of Nature could not be preserved intact in speech and writing. But, however, the meanings other than the intended one which are usually drawn from the Vedic texts, do not strictly conform to the requirements of grammar and logic and the injunctions laid down by Jaimini in the *Pūrva Mīmāṃsa*. However much flexible and elastic a language may be, it is altogether beyond all reasonable expectation to assume that a statement made in that language would give a not incoherent second meaning, satisfying all the injunctions that are expressly and by implication laid down for the proper understanding of its exact meaning. The writer, therefore, does not labour under the fallacy, that if a continuous and methodical interpretation of the Vedas, though differing materially from the more common but decidedly incorrect one, is put forth before the public, the thoughtful Vaidikas would in any way discountenance it inasmuch as it complies with the requisitions laid down by Jaimini.

With this preamble we shall proceed to a consideration of the intrinsic merits of the two methods generally followed, namely, the Primitive and the Historical. The first or the Primitive method detects in the Vedas a number of fables and legends. It takes one of them, and finds an explanation of it in the assumption that it took rise at an early period of the Hindu nation's existence and its civilization, when men,

having little or no knowledge of the external world, were accustomed to imagine some supernatural personage behind every natural phenomenon. Satisfied with this explanation, the followers of this method explain away the rest of the so-called fables and legends in the light of this assumption, and deduce the theory that the Vedas are the embodiment of fables and legends, which have arisen among the Hindus at an early stage of language and civilization, and which are but the convictions of these primitive men as to their gods or other divine personages, their origin and early history and the heroes connected with it, the origin of the world, etc. Now, we have called this method Primitive, because, like the postulated primitive races of antiquity, it has not been capable of finding out a rational explanation of facts, but is content with only the first rush of the mind towards an explanation however grotesque and sophisticated it may be. All the harsh epithets which the advocates of this method have deemed fit to apply to the so-called primitive men of the Vedic times, apply with even more appropriateness to these men of letters themselves. We do not for a moment deny that, for methods, the three sources of evidence adopted by these scholars, namely, comparative philology, comparative mythology, and deductive psychology, are any the less valuable and necessary. But the defect which has invariably led their advocates to a false valuation of the Vedic contents, is the foregoing assumption for whose justification no rational evidence has ever been adduced. To all but the man who, in common with the Vedic *Rishis*, knows that the mythology found in the Vedas is the symbolic expression of important scientific experiments, the assumption appears to be convincing indeed. But there are also others who, while being anxious to repudiate the method followed by these primitive investi-

gators, with whom they are unable to fall in since they find that this method is not warranted by the Rishis, cannot at the same time find their way to explain the inconsistency, contend that the legends and fables have a place only in the *Purānas* and other works of a later date, not in the Vedas which are exclusively philosophical in character (Guru Datta). This version is a gross denial of facts and finds but a few adherents. The Rishis maintain that mythology, which rightly has a place in the Vedas, is the figurative representation of scientific experiments and phenomena. The Vedas contain this as well as an explanation of the philosophical problems of our existence, based on these facts and principles of the positive sciences. What, then, the value of this Primitive method is, the reader might surmise for himself.

The second or the Historical method defeats its own ends, being fraught with the same difficulties as beset the first method in conjunction with which it is used. We have seen that the Primitive method starting with a view to infer the condition of the people of the Vedic times by a correct interpretation of the contents of the Vedas, misses its aim and assumes that very condition to be primitive. No less deceptive has been the result of the application of the Historical method, for during the interpretation of the records of antiquity the same assumption is made use of. All the deductions that are derived by adopting the one method are obtained by following the other; but in vain is our toil since they are built on a loose foundation that presents the great danger of the structure collapsing no sooner than the foundation is shaken. It is this common defect that has invalidated the results of both these methods, especially with the advent of the Scientific method, which has brought to light astounding revelations as to the supremely scientific

character of the Vedic civilization.

The method which we have followed in this volume comes directly from the *Rishis*. We have christened it by the phrase Scientific method inasmuch as it neither assumes any hypothesis nor rests on analogical and deductive reasoning, but, on the contrary, it is entirely based on the inductive method of the Scientists. The Vedas, we are told by the *Rishis*, are not written in the *laukika* or the ordinary language. The ancient Vedic scholars make a distinction among three classes of words in the Samskrit language,—the Yaugika, the *Rûrhi* and the *Yôga-rûrhi* words. “A *yaugika* word is one that has a *derivative* meaning, that is, one that only signifies the meaning of its root together with the modifications effected by the affixes. In fact, the structural elements, out of which the word is compounded, afford the whole and the only clue to the true signification of the word. These being known, no other element is needed to complete its sense. Speaking in the language of modern logic, the word is all *connotation*, and by virtue of its connotation determines also its denotation. A *rûrhi* word is the name of a definite concrete object, or answers to a definite concrete technical sense, not by virtue of any of its connotations but by virtue merely of an arbitrary principle. In the case of a *yaugika* word, we arrive at the name of an object by what may be called the process of generalisation. We see, taste, touch, smell, and operate upon the object by the multifarious means man possesses of investigating properties of sensible objects ; we compare the sensible impressions it yields with sensible impressions already retained in our minds and constituting our past knowledge ; we detect similarities between the two, and thus get a *general* or a *generic* conception. To this generic conception we give an *appropriate* name by *synthetically*

arriving at it from a *root*, a primitive idea or ideas. The word, therefore, thus ultimately formed, embodies the whole history of the intellectual activity of man. In the case of a *rûrhi* word, the process is far different. We do not generalise. Nor is, therefore, any synthesis required there. We only roughly discriminate one object or class of objects from other objects, and *arbitrarily* place a phonetic *postmark*, as it were, upon it. An individual, to roughly discriminate him from others, is arbitrarily called John, another Jones; so an object is arbitrarily denominated *Khatva*, another *Mala*, and so on. Here we only discriminatively specify the object we are naming, without coming into general contact with it.

"A third class of words, *yôga-rûrhi*, is one in which two words are synthetically combined into a compound, denoting a third object by virtue of the combination of these two words. Such words express any relation, or interaction of phenomena. The *Kamala* stands, for instance, in the relation of the *born* to *mud*, the bearer; hence *kamala* is denominated as *pankaja*, (*panka*, the mud, and *ja* signifying to bear).

"Now the author of the *Mahâbhâshya* maintains that the Vedic terminology is all *yaugika*.

" 'Nama cha dhatujamah Nirukte Vyâkarane Shakartasya cha tokam. Naigame rûrhi bhavam hi susadhu.' *Mahâbhâshya*, Chap., III, Sect., III, Aph., I.

"Which means:—Etymologically speaking, there are three classes of words, the *yaugika*, the *rûrhi* and the *yôga-rûrhi*. But the authors of the *Niruktas*, *Yâska* and others; and *Shâkatâyana*, among the grammarians, believe all words to be derived from *dhatu*s, that is, believe them to be *yaugikas* and *yôga-rûrhis*, and *Pânini* and others believe them to be *rûrhis* also. But all the *Rishis* and *Munîs*, ancient authors and commentators, without exception, regard



Vedic terms to be *yaugikas* and *yôga-rûrhis* only ; and the *laukika* terms to be *rûrhis* also." (Pundit Guru Datta Vidhyârthi)

The Veda therefore exclusively contains Yaugika terms, that is, terms which have a derivative meaning. The form of the Yaugika word is arrived at by the application of the inductive method of science. Necessarily, therefore, the method of interpretation that abides by this altogether neglected mandate cannot be other than Scientific.

But, although this main principle of the working of this method is understood, there is yet a solid obstacle in the way of the true investigator which is probably the most difficult to surmount. It is easy to say that since the Veda contains for the most part Yaugika terms it can be easily interpreted. But it is not so easy to make out these words without committing serious mistakes which dangerously modify the meaning of the Vedic texts. In fact, it appears to have been one of the chief ambitions of the *Rishis* for reasons that will follow, to make this difficulty all the more seriously felt by the Vedic student. On the first palm leaf composing '*Agrouchada-Parikshai*'—a work dealing with the initiation into the enduring mystery of the Vedas—"we find the following words written, like an inscription, with a sharply pointed stick :

"The sacred scriptures *ought not* to be taken in their *apparent meaning*, as in the case of ordinary books. Of what use would it be to forbid their revelation to the profane if their secret meaning were contained in the literal sense of the language usually employed ?"

"As the soul is contained in the body,

'As the almond is hidden by its envelope,

'As the sun is veiled by the clouds,

' As the garments hide the body from view,  
 ' As the egg is contained in its shell,  
 ' And as the germ rests within the interior of the seed,  
 ' So the sacred *law* (Dharma) has its body, its envelope,  
 its clouds, its garment, its shell, which hide it from the  
 knowledge of the world.'

" ' All that has been, all that is, everything that will be,  
 everything that ever has been said, are to be found in the  
 Vedas. But the Vedas do not explain themselves, and they  
 can only be understood when the Guru has removed the  
 garment with which they are clothed, and scattered the clouds  
 that veil the celestial light.'

" ' The *law* is like the precious pearl that is buried in  
 in the bosom of the ocean. It is not enough to find the  
 oyster in which it is enclosed, but it is also necessary to open  
 the oyster and get the pearl.'

" ' You who, in your pride, would read the sacred scrip-  
 tures without the Guru's assistance, do you even know *by what*  
*letter of a word you ought to begin to read them*—do you  
 know the secret of the *combination by twos and threes*—do  
 you know when the *final letter becomes an initial and the*  
*initial becomes final* ?'

" ' Woe to him who would penetrate *the real meaning of*  
*things* before his head is white and he needs a cane to guide  
 his steps.' " \*

What does this mean? Does it speak of magic and  
 myth, or science?

With a view to incite corruption and neglect of  
 the Vedas, much capital has been made of late out  
 of the fact that they should not be taught to the Sûdra

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\* Jacolliot's " Occult science in India," pp. 102, 103.

and the fair sex. But when we look at it coolly and disinterestedly, the advocates of this ancient policy will be found to be in the right. The present Western nations are experiencing the results of not forbidding the revelation of the Vedas (sciences) to the profane. Murder, bloodshed, destruction, and dishonour abound in this great conflagration.\* Nothing so dreadful would have been possible, if only the Scientists had the forethought to curtail the improper use of the Principles of Nature by refusing to impart that knowledge to the profane, a term applied to those who are outside the fold of the Sâtvikas. It is not true, however, that this dictum was in force during the time when the Vedas were fully understood, and the control of the society rested in the hands of the scientists who fostered and effectively put into execution the principle of identity of man and woman; for we have references in the Upanishads to women and Sûdras versed in the Vedas. Nay, it is expressly laid down that they were debarred from the study of the Vedic Literature only because they lacked the training necessary to handle it. Any number of *sûtras*, such as "Let us study Grammar that we may not be treated like women (and Sûdras)," may be quoted in confirmation of the statement made above. It was found necessary to apply it effectively, when it was feared that the unenlightened, who generally filled the ranks of women and Sûdras (servants), would, by their interference, contort and modify words and sentences, thereby reducing the texts to a meaningless muddle. "The Veda is afraid of the man of little learning lest he should hurt it," that is, contort it. But for this fear there is no necessity nor even any reason for such an injunction, and one will not wonder if the same attitude is assumed by the modern Rishis, when

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\* Written during the early part of 1918.

they are driven to realize that the knowledge of the Laws of Nature is intended to further our knowledge of the ultimate basis of manifestation, not for the mere fulfilment of selfish ends which in their train, as is only too well known, bring but unhappy results.

The Rishis knew full well that this edict was as good as asking a curious child not to eat a delicious fruit put into its hands. Besides, they knew that it was well nigh impossible to recognize the Sûdra or the Brâhmana in man. But they had an extraordinary resource of the knowledge of human nature at their disposal, which enabled them to equitably decide in these cases. *The more the interest and faith manifested the higher the stage of the individual in the scale of evolution.* The ideal Brâhmana is distinguished from others by his inborn spirit of renunciation, divine thirst for knowledge, and love for living beings. The Rishis made these qualities themselves the judges as to whether one was a Sûdra or a Brâhmana. They covered the Law with successive thick layers of to-us-uncouth garments, sufficiently deceptive to bewilder and lead astray the student and thus test his *sraddha* and *bhakti*. A Sûdra would be forced by the very ungainliness of the terms in which the law is couched to relinquish all hold on the Vedas, but a Brâhmana, inspite of repeated failures, would hold on to them because he firmly believes in the greatness and magnanimity of the Rishis: so much so that he cares not whither he is led by following their footsteps. It is this respect and love of knowledge that makes one a Brâhmana.

To such a person the Guru will "open the oyster" in which "the precious pearl"—the Law of Nature—is enclosed. But we, to whom no such Guru is available, have to depend on the inspiration from our own inner Self. We must

perform severe *tapas*. We must call to our assistance the discoveries of modern Scientists—we must know “the secret of the combination (of elements) by twos and threes.” Then we must know “by what letter of a word” we ought to begin to read the Vedic texts in order to arrive at a meaning different from what is obtained from the outward form of the verse and productive of material results. In other words, we must develop that intuitive perception which enables us to effect the correct *padavibhāga*, or analysis of words and sentences, such that the text would then give a meaning relating to the objects of physical sciences. Then only we will be able to know when the final and initial letters of words as analyzed at present, will become the initial and final letters of the true ones which the Rishis had in their minds when compiling the Vedas. This is the purport that is intended to be carried by verses such as:—

“He who can analyze speech, word by word, accent by accent, letter by letter, he and he only is fit to be a teacher of *Yajñas*.”

“Let us study Grammar that we may be fit to be directors of *Yajñas*.”

“One seeing does not see speech; one hearing does not hear her; to one she unfolds her from as a loving wife shows herself to her husband in fair garments.”

“Where wisemen draw speech hither and thither in their minds purifying it as men purify grain with a winnowing basket—there friends learn what friendship is; a gracious fortune is upon their words.”\*

Aye, to finish this work our span of life is far too short. Yet man's is the trial.

The new method of research inculcated in this volume is

\* Quoted by Sāyana in his preface to the Rig Veda.

justified on more than one ground. Firstly, it affords the most direct and natural interpretation that suggests itself to an unprejudiced mind. By the phrase unprejudiced mind it is not meant that an appreciation of the literature and its scientific character is precluded. It is in fact essential for its right understanding. What is actually meant is that none of our modern theories, howsoever sound they may appear to be, should influence us in estimating the value of these works. For instance, the ideas relating to *Vimānas* and *Astras* expressed in the *Purāṇas* and works of their stamp, when subjected to the operation of the modern theory of "perpetual evolution", would volatilize in the form of imaginations of a diseased mentality. Avoiding these pitfalls and snares, the invariable accompaniments of a prejudiced mind, were we to look at the *Vedas* face to face, we find ourselves unable to be satisfied with the expositions of the modern commentators. The want of natural simplicity in the customary interpretations is manifest at every turn. Even the most trusted commentator contorts words and sentences in order to derive a meaning which conforms to his own way of explaining them. In doing so he half-unawares loses sight of the injunctions of Jaimini, conformity to context and common sense, and reduces the whole thing to a muddled up bundle.

Secondly, the method we have herein followed, with a robust sincerity characteristic of its genuine verity, follows Jaimini's injunctions as to a hidden meaning in the *Vedas*, the knowledge of which enables one to fulfil all his desires. The authority of Jaimini is only next to that of Vyāsa, the compiler of the *Vedas*. This fact is admitted by the ancient commentators although they themselves do not understand the esoteric purport of the texts. There seems

to be some misunderstanding, even amidst enlightened circles, as to the way in which the power and greatness spoken of in the Vedas is obtained. It is held that the mental recitation of the *mantras* would bestow on the individual the reported results. But a careful study of Jaimini's pithy syllogisms would falsify this belief. He is most emphatic in stating that the result as well as the means applied are fully material ; it is the *Yajña*, a material process, that produces a material result. He is, however, careful in not denouncing the former view simply because in case the latter view should cease to prevail, at a time like the present one, at least the former may help to perpetuate the Vedas.

In the third place, it is completely logical and scientific, and is the only one worthy of the dignity of the subject. It conforms to both the spirit and the letter of the Vedic passages. The mediæval commentators never cared for the spirit of the verses, but confined themselves to the location and explanation of individual words and that, too, in a wrong way. The new method on the other hand recognizes a running continuity in, and a rational relationship among, the subjects dealt with in the various detailed divisions of the Vedas, just as a student of physical sciences recognizes a continuity and relationship in their various branches, or even in the detailed divisions of a single branch, such as, Physics or Chemistry.

Fourthly, it satisfactorily solves all the difficulties that have been raised from time to time by various scholars. To take a single instance, Max Müller, in his "India ; what can it teach us?," observes :—"I shall say even more, and I have said it before, namely, that supposing that the Vedic hymns were composed between 1500 and 1000 B. C., we can

hardly understand how, at so early a date, the Indians had developed *ideas which to us sound decidedly modern.*" The position of this renowned Orientalist is indeed very pitiable especially when we consider in what unmistakable terms he had condemned the Vedic Literature as corresponding to "the fables and traditions and songs of savage nations, such as we can study at present in what we call a state of nature." This difficulty, and the apparent anomalies in the Vedic passages, can be explained only by admitting this new method, when the latter deduction falls to the ground as being a totally incorrect estimate, originating from a misunderstanding, of scientific facts owing to the quaint garb in which they are clothed and the unique method of representation practised by the Rishis, while the former inference remains true as being a fairly satisfactory appreciation of the text by persons not accustomed to view things from a scientific view-point.

But above all the justification of this Scientific method rests in the results which are derived by its adoption. It enables us to achieve the practical results enumerated by the Vedic Rishis as arising from the performance of *Yajñas* (scientific experiments). There should not be any doubt as to its validity and veracity after the promised expectations are fulfilled. It thus stands out to be the only scientific way of interpreting the Vedas.

The Hindu revered the Veda more than anything else. It was the one authority for him in all matters, whether of mind or matter. To him it was the revelation—revelation in the sense that it reveals the true nature of this Existence. His main ambition in life was to know what the Veda preached, to practise what it said, and to go ultimately beyond it and live in unison with the Eternal Principle. His respect, love, and appreciation of



the Veda were so great that he did not shrink from renouncing the very throne to secure an initiation into its grand mysteries. The Veda was to him the certain means of knowledge: it endowed him with the scientific bent of mind and, consequently, was the path to *Môksham*. It was the one changeless thing in this existence that has preserved its individuality at all times. Hence it was that the Hindu saw no honour worth cherishing more than that of consecrating and defending the Veda. His life was but a cheap article that might be sacrificed ungrudgingly at the alter of a disputation of the authority of the Veda. Sects and sects are there but only such are termed Hindu that have the Veda for their authority. What silly fools were the Hindu philosophers to depend on the songs of shephards and of "savage nations" for their inspiration, knowledge, and deliverance!

What is the language in which this Veda, the first of the literary works that mankind possesses, is written? Greek, Latin, Zind, Teutonic, Mongolian and other ancient languages of the world are but the new-born babes compared to this most scientific, and consequently, immortal language, the Samskrit. In this they have sung the valient deeds of chivalrous monarchs, and in this the Principles of Nature and their mutual relations are recorded. We now term the latter Science. An Upanishad says: "The *Devas*, being afraid of death, entered upon (the performance of experiment, i.e., *Yajña*, prescribed in) the threefold knowledge (the three Vedas.) They covered themselves with the metrical hymns. Because they covered (chad) themselves with the hymns, therefore the hymns are called Chandas." It will be shown in the fourth chapter that the *Devas* and *Yajña* are respectively the Chemico-Physical Agents of Nature and scientific experimentation. Assuming this the foregoing statement

may be explained thus:—With a view to effectively preserve scientific knowledge for their posterity, the Rishis enumerated the interactions of the objects of physical sciences in metrical verses as recorded in the three Vedas. Now, inasmuch as these metrical verses “cover” the properties of the objects of physical sciences they are termed Chandas, that is, coverers.

The difference between the Vedic and ordinary literature exists not only in the words that are used and in the formation of sentences, but also in the nature of the subject matter dealt with. In the former, the History of the *Devas* and how they may be “propitiated” in order that man’s desires may be fulfilled, are set forth at length; while in the latter anything but that contained in the Vedic Literature is indulged in. Eternity, immutability, and universality are a few of the characteristics of what the Veda is composed of; whereas conventionality, changeableness with time and place, sensual satisfaction characterize the literature other than that of the Vedas.

What could this Vedic Literature be but the embodiment of Natural Laws?

In the way towards the proper evaluation of Vedic Literature we have the *Âsuric* instinct instilled into us by Nature, which effectively prevents us from realizing that history repeats itself, by directing our mental vision ever on the diversity of manifestation. Events have come and gone and similar events have yet to come and go. Changes of ideas, states, and religions have taken place in the past and will take place in the future. Similarly, there was a time when the positive sciences were in full swing on the face of this earth. But in accordance with one of their own Laws, they became erased from the objective memory of humanity. But a revival has

set in under the guidance of the subjective mind of the Scientists, which will continue to progress until we can go no further, and then will set in the backward movement as surely as the sun sets in the evening.

The Veda is the record of this scientific knowledge. Jaimini says: "The Veda is the only authority for Dharma: the Veda is that authority and nothing else." In the *Purushârthânusâsana* it is laid down that "Dharma and Brahma are to be learnt from the Veda only". From these statements it is clear that the Veda is an authority for Dharma. No doubt Veda being derived from Vid, to know, means knowledge. But this does not in any way contradict the preceding remarks, for Dharma, as the following citations will prove, is but the sum total of Natural Laws. Sâyana, commenting on this definition of the Veda, says: "To establish the former of these propositions Jaimini in his fourth *sûtra* shows that Dharma is not cognizable by our senses. 'Perception is not a cause there because perception deals with things that are, not with things that are to be.' Dharma will *arise after the experiment (Yajña) producing it has been performed*: it does not exist before, and perception is therefore useless here. Nor even afterwards can Dharma be apprehended by our senses. Because it is destitute of form, etc. That is the reason why it is commonly called, '*adrishta*', that which is unseen. Nor is the second source of knowledge inference, available. Why? On account of the absence of characteristic marks. You will perhaps say that joy and sorrow are such characteristic marks for Dharma and Adharma. True. But they are given as such in the Veda itself."

In another place Sâyana adds thus: "And knowledge of Dharma and Brahma is the immediate use of the Veda.

Nor need we doubt lest such knowledge,—like that, for example, that the earth has seven continents, or that a certain king is going somewhere,—has no relation to any end of man. Dharma is eulogised as productive of objects of human desire in the following passages: ‘Dharma is the support of the whole world: throughout the world people flock to him who has most Dharma. (*i. e.*, who knows most about the Laws of Nature), everything rests upon Dharma. Therefore they call Dharma man’s highest good.’ Dharma restrains a king in act to strike and to the weaker of two disputants brings victory as from a king’s help: truly it is an object of desire to men.”

What could these *sūtras* and this commentary portray save that the Vedas are treatises on scientific subjects? In these two paragraphs is embodied that interpretation of the two terms Veda and Dharma that prevailed among the Vedic Rishis. We are here told that “the Veda is an authority for Dharma.” Ancient authorities hold also that the Veda is a collection of *mantras* which embody directions to perform *Yajñas* for acquiring knowledge of the manifested Universe. Elsewhere\* we have established that *Yajña* is the Vedic expression for what we now call scientific experimentation. The directions that the *mantras* embody are, therefore, such as will enable us to perform scientific experiments which when completed communicate to us the knowledge of the Laws of Nature. The Veda is therefore a work on scientific subjects; and when it is said that this work “is an authority for Dharma”, the latter must, at least, be one of the scientific subjects dealt with. The next statement that “*Dharma will arise after the Yajña producing it has been performed*”, decidedly reveals its identity with the totality of the Laws of

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\* Vide p.

Nature; for that which manifests when an experiment is performed is the Law of Nature bringing about the reaction. It is a very natural remark to say that this Law of Nature is not cognizable by our senses inasmuch as it is not an object possessing form, etc. Nevertheless we can assume of its existence. No observation can be made of the result of an experiment before its performance. Therefore there can be no inference as to the existence of the Law before the performance of the experiment. Hence is it said that "it does not exist before." The statement "nor is the second source of knowledge, inference, available", must be understood as referring to Dharma not to the result of the experiment. Our inference from the performance of an experiment is that the interaction among some known reagents produces a certain set of results. This has not the remotest reference to the agent (the Law) that produces the interaction. We can only assume that this agent exists, and term it Dharma or Natural Law, but after all it is only an assumption, not an inference.

In the second paragraph we are further informed that Dharma is of the nature of Natural Truths. Just as the facts of science do give us a definite knowledge relating to the workings of Nature, and thus enable us to "derive good and ward off evil", so does the knowledge of Dharma provide us with knowledge and power, and when made use of obedient to its own Laws secures the objects of our desires. "Dharma is the support of the whole world: ....., everything rests upon Dharma." This is literally true of the agency of the Laws of Nature. Without the directive agency of Natural Laws, neither the world nor anything at all could have existed.

It is indeed difficult to define the Truths of Nature in more appropriate terms than as herein set forth. And for

this reason it defies all attempts to comprehend how pitiaibly our learned scholars have overlooked this obvious meaning, unless we suppose that they have been a prey to the undignified "fashion of race superiority and cultural repugnance sporting in the guise of historical judgment and philosophical survey."

To attempt at the complete explanation of the Vedas at this stage of human development is impossible and perhaps will be doing more harm than good; for the knowledge contained in them is reported to be of such magnitude that the possession of it by men untrained in *tapas* would impel them to effect social confusion and dismay. In order to avoid sowing the seed of this apple of discord, but at the same time to pave the way for the proper understanding of the Vedas by the Sâtwikas, it is proposed to consider here such evidence as would explain the nature of the Vedas and the right method of their investigation. Derived from the root Vid, Veda is equivalent to knowledge. This in itself should put an end to the clamour that the Veda is a conglomeration of superstitious beliefs. Any denial of this assertion will be confronted with the unanswerable difficulty that how can men, possessing such magnificently developed minds and so reasonable a logic as to stumptuously codify a language so beautiful, so melodious, and such that none of its words remains without a root, the root itself having in the majority of cases a meaning given by Nature, be susceptible of so palpable a lie or deception as to declare that a horse gave birth to a human being or a being superior to man, a *Devata*, all the time being conscious that they are speaking the truth and nothing but the truth. Should a modern Samskrit scholar meet with such a statement as the one just mentioned, his first impulse would be to laugh at it and throw the book aside deeming it unworthy of his precious

attention, not waiting to ponder over it even for a moment. His mind is so boisterous that he cannot conceive that men can speak in metaphors and, particularly, that the Orientals make it a point to use figurative language in every case of some valuable truth. Here he has lost his ground unawares. It is he who has been susceptible of superstition inasmuch as he understands falsehood for a verifiable reality. The metaphors used are intended to be hard to fathom in order to mislead men of his stamp, who are ever on the alert to laugh at and deride others; and if he cannot understand them, it is his own fault. But he who is guided by faith and interest, will, by degrees, perceive the validity of the figure of speech, and following his own seemingly peculiar logic, will try to explain the rest.

This, however, is a digression. To return to the assurtion itself, it can be argued that when with all our boasted scientific advancement we have not been able to invent a language that can cope with, not to say excell, the admittedly "most scientific language," Samskrit, what right have we to assume that the ancient Bhâratiyas were less advanced than ourselves in scientific method and its application? What necessity was there for them to prepare a grammar and compose the Vedas according to its rules, if the imputation that they are the "songs of savage nations" has any semblance of truth in it? That they had not a grammar is false, for they were not idle enough to waste their time in uttering meaningless syllables from morning till night; and to say that the Vedic grammar is not the one in vogue at present, is not an argument against them. But, really speaking, this latter misstatement arises out of the misconception that the Vedas are "savage-songs."

Again, if their value is really trifling, why should their

authors take great precautions to preserve them intact by injunction and direction? That since any man or group of men cannot "see" beyond their limited view they would feel that their own statements are the embodiment of truth, and as such would take every precaution to propagate them, cannot be adduced in the present case for the simple reason that they, foreseeing this very predicament, have, besides giving us high and unimpeachable authorities, confessions, and examples as to the profundity and divinity of the Vedas, reiterated their value with experimental data in the Upanishads. Proof to establish that what the Veda speaks of is not of such profundity as to deserve the special injunction of consecration is not forthcoming; and if put forth, will be unable to maintain its own ground. Whereas proof that it deserves our whole-hearted acceptance as such is seen when we consider the unfigurative utterances and logical deductions of the Vedānta, that which manifests at the end of the Veda which is the collection of scientific Truths.

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## CHAPTER II.

### EXTERNAL EVIDENCE AS TO THE NATURE OF THE VEDAS.

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**T**HE signification of the practical sciences—Disclosures of modern researches with respect to the Exact Sciences of the Hindus—Astronomy, Mathematics, Physics, Chemistry, Medicine, etc.—The result of applying deductive reasoning to these discoveries—Purâṇas and other kindred works are the sources of the External Evidence—Jaimini's view—Evidence from the Bhâratam—Interpretation of the story related about *Udaṇka*—Indra identified with electricity—Astras are the scientific weapons of warfare—Nâgās (literally “serpents”) = radiations from active matter—Science of Optics (*Gāndharva vidyâ*)—Air-ship named *Sambhaka*—Science of Botony—The perfect number seven—Its connection with the Periodic Series of the Elements—Haya = ray of light.

It is one of the drawbacks of our commentators that they do not do full justice to kindred literature when they are engaged in the investigation of a particular subject. It is repeatedly mentioned in ancient Hindu Literature that the Vedas are the only fountain-head of all sciences and arts ; and yet we are not willing to admit that there is a rational connection between these works and the usually practised sciences and arts such as Astronomy, Medicine, Engineering, Music, Sculpture, and Architecture. These sciences and arts, as the researches of Orientalists have shown, were in a very prosperous condition in India only a couple of thousand years ago. Since then the Hindus, on account of the degradation to which they have been subjected, have lost supremacy in

them and occupy now the position of unmeaning admirers of the achievements of their forefathers. The existence of these arts and sciences in Hindu life, is, however, a sure testimony of a scientific civilization that found acceptance among the ancient Hindus.

The utilisation of the practical sciences in daily life must needs presuppose scientific discovery and investigation both analytical and synthetic: and proficiency in one branch of science involves a comparatively high development in other branches as well. Consider the science of Astronomy which has been one of the favourite pursuits of both the ancient Bhâratiyas, the Rishis, and their much latter descendants. Without Mathematics and Physics little progress could be made in it. But what progress had the Hindus achieved in it? Writing about Hindu astronomy, Wilson observes:—

“The science of astronomy at present exhibits many proofs of accurate observation and deduction, highly creditable to the science of the Hindu astronomers. The division of the ecliptic into lunar mansions, the solar zodiac, the mean motion of the planets, the procession of the equinox, the earth’s self-support in space, the diurnal revolution of the earth on its own axis, the revolution of the moon on her axis, her distance from the earth, the dimensions of the orbits of the planets, the calculations of eclipses are parts of a system which could not have been found amongst an unenlightened people.”

The science of Hindu astronomy we possess now, is, on the authority of Bailly, “the remains rather than the elements of a science.” Mill in his “History of India” writes:—“Mons. Bailly, the celebrated author of the History of Astronomy, inferred from certain astronomical tables of

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\* Mill’s History of India, Vol. II, p. 106

the Hindus, not only advanced progress of the science but a date so ancient as to be entirely inconsistent with the chronology of Hebrew Scriptures. His argument was laboured with the utmost diligence, and was received with unbounded applause." The subject is so familiar to modern readers that it does not require elaborate exposition. Yet we cannot refrain from adding a few more quotations. Weber says: "Astronomy was practised in India as early as 2,780 B. C." ..... "Cassini, Bailly, Gentil, and Playfair maintain 'that there are Hindu observations extant which must have been made more than three thousand years before Christ, and which evince *even then a very high degree* of astronomical science'." Professor Wilson writes: "The originality of Hindu astronomy is at once established, but it is also proved by intrinsic evidence, and although there are some remarkable coincidences between the Hindu and other systems, their methods are their own." Elphinstone says: "In the more advanced stages, where they are most likely to have borrowed, not only is the mode of proceeding peculiar to themselves but it is often founded on principles, with which no other ancient people were acquainted, and showed a knowledge of discoveries not made even in Europe till within the course of the last two centuries." \*

In Mathematics, too, the Hindus had traversed a wide area. Prof. Macdonall says: "In science, too, the debt of Europe to India has been considerable. There is, in the first place, the great fact that the Indians invented the numeral figures used all over the world. The influence which the decimal system of reckoning dependent on these figures has had not only on mathematics but on the progress of civilization in general, can hardly be overestimated. During

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\* Elphinstone's "History of India," p. 133.

the eighth and ninth centuries the Indians became the teachers in arithmetic and algebra of the Arabs, and through them of the nations of the West. Thus, though we call the latter science by an Arab name, it is a gift we owe to India." \*

"Sūrya Siddhānta contains a rational system of trigonometry, which differs entirely from that first known in Greece and Arabia. In fact it is founded on a geometrical theorem, which was not known to the geometricians of Europe before the time of Vieta, about two hundred years ago. And it employs the sines of arcs, a thing unknown to the Greeks, who used the chords of double arcs. The invention of the sines has been attributed to the Arabs, but it is possible that they may have received this improvement in trigonometry as well as the numerical characters from India." †

The Hindus knew the relation between the circumference and the diameter of a circle and denoted the fraction, which we now call  $\pi$  by the ratio 3,927 to 1,250, centuries before the moderners rediscovered it. Count Bjornstjerna says: "In order to obtain the result thus found by the Brāhmans, even in the most elementary and simplest way, it is necessary to inscribe in a circle a polygon of 768 sides, an operation, which cannot be performed arithmetically without the knowledge of some peculiar properties of this curved line, and at least an extraction of the square root of the ninth power each to ten places of decimals. The Greeks and Arabs have not given anything so approximate." ‡

Prof. Wallace says: "The researches of the learned have brought to light astronomical tables in India which must have been constructed by the principles of geometry, but the

\* "History of Samskrit Literature," p. 424.

† Edinburgh Encyclopedia, "Geometry," p. 191.

‡ "Theogony of the Hindus," p. 37.

period at which they have been framed has by no means been completely ascertained. Some are of the opinion that they have been framed from observations made at a remote period, not less than 3,000 years before the Christian era; and if this opinion be well-founded, the science of geometry must have been cultivated in India to a considerable extent long before the period assigned to its origin in the West; so that many elementary propositions may have been brought from India to Greece." He adds: "In geometry there is much deserving of attention. We have here the celebrated proposition that the square on the hypotenuse of a right-angled triangle is equal to the squares on the sides containing the right-angle and other propositions, which form part of the system of modern geometry. There is one remarkable proposition, namely, that which discovers the area of a triangle when its three sides are known. This does not seem to have been known to the ancient Greek geometers."

About algebra Prof. Wallace writes thus: "In algebra the Hindus understood well the arithmetic of surd roots and the general resolution of equations of the second degree, which it is not clear that Diaphantus knew, that they attained a general solution of indeterminate problems of the first degree, which it is certain Diaphantus had not attained, and a method of deriving a multitude of answers to problems of the second degree, when one solution was discovered by trial, which is as near an approach to a general solution as was made until the time of La Grange." He further says: "That before an author could think of embodying a treatise on algebra in the heart of a system of astronomy, and turning the researches of the one science to the purpose of the other, both must have been in such a state of advancement as the

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\* Edinbrugh Encyclopædia, "Geometry," p. 191.

lapse of several ages and many repeated efforts of inventors were required to produce. This is unanswerable evidence in favour of the antiquity, originality and advance of the Hindu mathematical science.” \*

Har Bilas Sarada writes: “The credit of the discovery of the principle of differential calculus is generally claimed by the Europeans. But it was known to the Hindus centuries ago. Bhāskarāchārya, one of the world’s greatest mathematicians, has referred to it in various places.

“Mr. Spottiswoode says: ‘It must be admitted that the penetration shown by Bhāskarāchārya, in his analysis is in the highest degree remarkable in that the formula which he establishes, and his method, bear more than a mere resemblance—they bear a strong analogy—to the corresponding process in modern mathematical astronomy; and that the majority of scientific persons will learn with surprise the existence of such method in the writings of so distant a period and so remote a region.’†

“Mr. Lethbridge says: ‘Bhāskarāchārya is said to have discovered a mathematical process very nearly resembling the differential calculus of modern European mathematicians.’‡

“Dr. Ray, however, discusses the whole question and shows that Bhāskarāchārya not only knew the principle but applied it to astronomy. He says: ‘The astronomical *truti* of time measures about the thirtyfour thousandth part of a second. This is of special value in determining the exact character of Bhāskarā’s claim to be regarded as a precursor of Newton in the discovery of the principle of the dif-

\* Mill’s History of India, Vol. II, p. 151, Wilson’s Note.

† J. R. A. S., Vol. XVII.

‡ School History of India, Appendix A, p. ii.

ferential calculus, as well as in its application to astronomical problems and computations. This claim, as I proceed to show, is absolutely established. It is indeed far stronger than Archimedes' to the conception of a rudimentary process of integration.\* Dr. Ray then shows that Mr. Spottiswoode's error in thinking that Bhâskara's method is only an analogous one but is not the differential calculus itself, is due to the insufficiency of data supplied to him for his opinion."

About Physics and Chemistry the following facts are recorded in the "Modern Review", June 1918, under the title "The Exact Sciences of the Hindus" by Benoy Kumar Sircar, M.A.

"(a) Heat :

(i) Light and heat were known to Kanada as different forms of the same substance.

(ii) Solar heat was known to Udayana as the source of all the stores of heat.

(iii) Heat and light rays were believed by Vâchaspati (A. D. 850) to consist of very minute particles emitted rectilinearly by the substances.

(iv) Rarefaction in evaporation and the phenomena of ebullition were correctly explained by Sankara Mishra.

(b) Optics :

(i) The phenomena of translucency, opacity, shadows etc., were explained by Udyôtakara.

(ii) The angle of incidence was known to be equal to the angle of reflection. This was known to the Greeks also.

(iii) The phenomenon of refraction was known to Udyôtakara.

(iv) The chemical effects of light rays were known to Jayanta.

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\* "Hindu Superiority."

(v) Lenses and mirrors of various kinds, spherical and oval, were used for purposes of demonstrations. Light rays were focussed through a lens on a combustible like paper or straw. (*The making and polishing of glass was a great industry in India. According to Pliny the best glass was that made by the Hindus*).

(c) Acoustics:

(i) Physical basis of sound: Two theories were held about the vehicle or medium of propagation. Shabara Swāmi knew it correctly to be the air. But Udyōtakara and others knew it to be ether (Seal).

(ii) Wave motion: The sound waves were understood by both schools. But Prashastapada knew them to be transverse; and Udyōtakara and Shabara Swāmi understood the transmission of sound to be of the nature of longitudinal waves (Seal).

(iii) Echoes were analyzed by Vijñānabhikṣu.

(iv) Sounds were distinguished according to their tones and over-tones, volume or massiveness and quality or timbre, by Bātsyāyana, Udyōtakara, and Vāchaspati (c. A.D. 850).

(v) Musical notes and intervals were analyzed and mathematically calculated in the treatises on music, e.g., Shārangadēna's "Saṃgītaratnākara" (1210-47), Dāmōdar's "Saṃgīta-darpana" (1550-1647), etc. The relative pitches of the notes of the diatonic scale were according to Kṛishnaji Ballala Deval, in "Hindu Musical Scale" accurately determined (Clements, and Fox-Strongway).

(vi) The Hindus followed just intonation (Seal).

(d) Magnetism.

(i) Elementary magnetic phenomena could not but be observed. The attraction of grass and straw, etc., by amber, and the movement of iron needle towards the magnet were



explained by Samkara-Mishra as due to 'adrīṣṭa',

(ii) Bhōja (c. 1050 A. D.) in his directions for ship building gave the warning that iron should not be used in holding or joining together the planks of the bottoms intended to be sea-going vessels. The fear was entertained lest iron should expose the ships to the influence of magnetic rocks in the sea, or bring them within a magnetic field and so lead to risk (Rādhākumud Mookerji)

(iii) Mariner's compass: Mookerji points out a compass on one of the ships in which the Hindus of the early Christian era sailed out to colonize Java and other islands in the Indian Ocean. The Hindu compass was an iron fish (called in Sanskrit "Matsya-yantra" or fish-machine).

(e) Electricity:

Most rudimentary electrical phenomena may have been noticed by Umasvati (A. D. 50). His theory of an atomic linking was based on the idea that two atoms to be combined must have two opposite qualities. He believed that atoms attracted and repelled each other according as they were heterogeneous (*i.e.*, unlike) and homogeneous (*i.e.*, like) respectively.

### Chemistry.

1. According to P. C. Ray, the earliest Hindus knew the distinction between green and blue vitriol. But Dioscorides, the Greek, and Pliny, the Roman, both belonging to the first century A. D., confounded the two. Even Agricola's ideas were not clear (1494-1555).

2. The scientific pharmacy of Sushrūta was modern. About the preparation of the caustic alkali he was careful enough to give the direction that the strong lye is to be preserved in an iron vessel. It was far superior to the process of a Greek writer of the eleventh century who has been eulogised by Berthelot (Ray).

3. According to Royle, the process of distillation was discovered by the Hindus.

4. By the sixth century the Hindus were the masters of the chemical processes of calcination, distillation, sublimation, steaming, fixation, etc. (Seal).

5. These processes were used by researchers of the Patānjali and Nāgārjuna cycles in order to bring about chemical composition and decomposition, e. g.,

(a) in the preparation of

- (1) Perchloride of mercury.
- (2) Sulphide of mercury.
- (3) Vermillion from lead, etc.

(b) in the extraction of

- (1) Copper from sulphate of copper.
- (2) Zinc from calamine.
- (3) Copper from pyrites, etc.

6. The importance of apparatus in chemical research is thus described in "Rasārnava", a work on chemistry of the eleventh century :

'For killing [oxidizing?] and colouring mercury, an apparatus is indeed a power. Without the use of herbs and drugs, mercury can be killed with the aid of an apparatus alone. Hence an expert must not disparage the efficacy of the apparatus (Ray's translation).' With this preamble the author introduces his account of the chemical laboratory, instruments, crucibles, etc.

7. In "Madanapāla-Nighantu", a work on drugs (14th century), Zinc was distinctly mentioned as a separate metal. Paracelsus was thus anticipated in India by about two hundred years.

8. The philosophy of mercury was a recognized branch of learning by the 14th century. It was one of the elaborated

sixteen in Madhvâchârya's collection of philosophical systems (1331). He mentioned "Rasârtnava" as a standard work on mercury.

9. "Rasaratna samucchaya" (treatise on mercury and metals) is a comprehensive work of the 14th century. It embodies particularly the whole chemical, mineralogical, and metallurgical knowledge of the Hindus developed through the ages. Like the "Brihad samhita" (6th century A. D.) by Varâbamihira it is a scientific encyclopædia. It is specially remarkable for its section on laboratory directions for experiments and description of apparatus.

10. The Hindus had no knowledge of mineral acids for a long period. But this defect was made up by their use of "Vida" which, says Ray, could "kill all metals." This was a mixture containing *aqua regia* and other mineral acids in potentia. The substance was probably discovered by Patânjali (Seal). Mineral acids were discovered almost simultaneously both in India and Europe during the 16th century.

The debt of Europe to Saracen Chemistry or alchemy is generally acknowledged by the historians of science (Thomson). This implies also Europe's debt to the Hindus, for they had taught these teachers of mediæval Europe."

We know that physics and chemistry are most essential for the formation of a science of medicine, writing about which Prof. Wilson remarks: "The ancient Hindus attained as thorough a proficiency in medicine and surgery as any people whose acquisitions are recorded. This might be expected, because their patient attention and natural shrewdness would render them excellent observers, whilst the extent and futility of their native country would furnish them with many valuable drugs and medicaments. Their diagnosis is

said, in consequence, to define and distinguish symptoms with great accuracy, and their *Materia Medica* is most voluminous." \*

Sir Willam Hunter writes: "Indian medicine dealt with the whole area of the science. It described the structure of the body, its organs, ligaments, muscles, vessels, and tissues. The *Materia Medica* of the Hindus embraces a vast collection of drugs belonging to the mineral, vegetable, and animal kingdoms, many of which have now been adopted by European physicians. Their pharmacy contained ingenious processes of preparation, with elaborate directions for the administration and classification of medicines. Much attention was devoted to hygiene, regimen of the body, and diet."†

He also says: "The surgery of the ancient Indian physicians was bold and skilful. They conducted amputations, arresting the bleeding by pressure, a cup shaped bandage and boiling oil; practised lithotomy; performed operations in the abdomen and uterus; cured hernia, fistela, piles; set broken bones and dislocations; and were dexterous in the extraction of foreign substances from the body. A special branch of surgery was devoted to rhinoplasty, or operation for improving deformed ears and noses and forming new ones, a useful operation which European surgeons have now borrowed. The ancient Indian surgeons also mention a cure for neuralgia, analogous to the modern cutting of the fifth nerve above the eyebrow. They devoted great care to the making of surgical instruments and to the training of students by means of operations performed on wax spread on a board or on the tissues and cells of the vegetable kingdom, and upon dead

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\* Wilson's Works, Vol. III, p. 269.

Imperial Indian Gazetteer, "India," p 120.

animals. They were expert in midwifery, not shrinking from the most critical operations, and in the diseases of women and children. Their practice of physic embraced the classifications, causes, symptoms, and treatment of diseases, diagnosis and prognosis. Considerable advances were also made in veterinary science, and monographs exist on the diseases of horses, elephants, etc.\*

"Their (Hindu) surgery," says Elphinstone, "is as remarkable as their medicine." Mrs. Manning says: "The surgical instruments of the Hindus were sufficiently sharp, indeed, as to be capable of dividing a hair longitudinally." One of the recent pronouncements on this subject is from Dr. Lauder Brunton who repeated what Dr. Clarke of Philadelphia once observed: "If the Physicians of the present day would drop from their Pharmacopœia all the modern drugs and chemicals and treat their patients according to the methods of Charaka, there will be less work for the undertakers and fewer chronic invalids in the world."

We do not propose to multiply these quotations, but we want to consider what inference can be legitimately drawn from these facts. So far, it is plain that the Hindus were engaged in scientific pursuits. Most of the scholars are of the opinion that they were so from very early times. When all other countries were enjoying the sublime happiness of unqualified ignorance, it was the lot of India, whether fortunate or unfortunate, to be teeming with sciences! Our object is not to dispute whether the dates assigned to the works dealing with these matters are correct or not. But we desire to enquire whether ever since the supposed manifestation of these "primitive sciences" the Hindus had been

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\* Indian Gazetteer, "India," p. 220. See also Weber's "Indian Literature," p. 270.

developing and improving their knowledge in these exact sciences, or, on the contrary, were becoming progressively impoverished in that commodity. Records show that the latter was the case.

The tradition of the Hindus assists us very much in arriving at a correct solution of this problem. The whole of the Hindu Literature is pervaded, through and through, with ideas significant of scientific theories and their deductions. Often we read in it figures of speech that are developed from scientific phenomena. This necessarily implies a certain amount of knowledge of these latter. This is more true of the most ancient literature than that of a later origin. In the *Purānas* and the two great Epics we find actual descriptions of the scientific achievement. *Vimānas* and *Astras* and other scientific inventions are at length dwelt upon. The results attending on their use have been practically sought for and reaped by persons whose names are connected with their use. Further, all literary compositions of the Hindus are unanimous in affirming that Hindu civilization had been travelling hitherto on the ebb of its wave-motion. They are one and all positive about the fact that the knowledge possessed by the Hindus has been diminishing both in extent and depth ever since the end of the *Dwāpara yuga*, about 5,000 years ago from now.

Scarcity of written works dealing with these physical sciences in very early times is, instead of being a negation, a proof of our proposition. Nobody, who is acquainted with the organization of Guru and Sishya, will deny that there was a custom, among the ancient Hindus, which invariably sought to transmit all knowledge from generation to generation mainly by oral instruction and delivery. Written books were few in olden times not because the ancients were igno-

rant of the art of writing and the materials to write with, but it was solely due to the fact that the *Rishis* thought that, if the knowledge embodied in a written book were to pass into the hands of those that were devoid of the *Sâtwika* qualities such as faith and direct interest, it would become a source of more harm to the individuals as well as to the society than good. To justify this assumed spirit of conservatism of the *Gura*, it must be mentioned that the knowledge was of such moment and so dangerous in character that the *Rishis* were perfectly right in prohibiting its revelation to those who had not the capacity and training to control their emotions, and selfish desires. "Knowledge came to the *Brâhmawa*," quotes *Yâska*, "and said, 'Protect me for I am your treasure: do not teach me to the scornful or the knavish or the sensual man; so shall I be strong.' ..... 'But if there be one whom you know to be pure, eager to hear, intelligent, and chaste, who will never do you harm, teach me to him, O *Brâhmawa*: he will protect me your treasure'." This is the correct view which blends the logical practicality and sense of science into a harmonious working standard, and it is this that distinguishes Hindu mentality from that of others. And the *Guru* made the interest and faith which a student manifested his passports for the reception of the instruction, and thus was the society kept alive so as to live in peace but not to enjoy as the present Westerners are enjoying in killing one another. \* It is, therefore, but meet that no written books should have been spread broadcast in the lower strata of the society, and this scarcity of books should on no account be taken as an evidence that scientific knowledge did not exist then. On the other hand, the *Hindus* made it a point to put

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\* Written during the early part of 1918.

down anything in writing, only when they found that the elimination of their own generation from on the face of this earth would also put an end to the knowledge in question." This is the reason why we have manuscripts written at only a comparatively late date. If there were at least a dozen interested students, they would not have had recourse to this mnemonic method of preserving the traditional knowledge since they fully realized its defects. We, therefore, should not be misled by finding works bearing the names of Patānjali, Āryabhatta, or Bhāskara and jump into the hazardous conclusion that the knowledge which is recorded in these works was not prevalent broadly diffused in the higher strata of the

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\* This is nearly admitted by Max Müller in "The six systems of Hindu philosophy" (p. 5). He says: "It is actually mentioned that the Southern Canon (the Tripitaka) was not reduced to writing till the first century B. C., under king Vattagāmani, about 80 B. C. Nothing can be more explicit than the statement in the chronicles of Ceylon on that point: 'Before this time the wise monks had handed down the texts of Tripitaka orally; and also the Atthakatha (commentary). At this time the monks, *perceiving the decay of beings (not MSS.), assembled and in order that the Law might endure for a long time, they caused it to be written down in books.*' Such a state of things is difficult for us to imagine, still if we wish to form a true idea of the intellectual state of India in pre-Bhuddhistic times, we must accustom ourselves to the idea that all that could be called literature then was mnemonic only carefully guarded by a peculiar and very strict educational discipline, but of course exposed to all the inevitable chances of oral tradition." It is clear that the reason given above is quite an authoritative one; but it cannot be argued from this premisis that the ancients were not acquainted with the art of writing. The statement that "the literature then was mnemonic only" is applicable only in a limited sense. That the mnemonic character was purposely maintained is evident from the fact that the Buddhist Tripitaka was not written down during the reign of Asōka although, at that time, writing was quite prevalent as is attested by the Inscriptions of Asōka.



Hindu society before the time when they are supposed to have come on the scene. Our decision should in fact be worded the other way : viz., that the authors whose names the works under consideration bear were admittedly only the redactors of the relics of knowledge,—as much as they could save of it,—but not its direct discoverers—a fact which is at once established and is also proved by Vyâsa's admission in respect of the Vedas.

Naturally, the reader would like to know, at this stage, how any one could substantiate the statement that the knowledge was of such magnitude as to require or even deserve this prohibitive injunction knowing that it is, so far as we possess it now, very trivial and primitive. In answer to this, it is only necessary to point out that what has been brought to light by modern researches is only a minute fragment of a great whole. The Guru, in the course of oral instruction, will invariably fail to communicate all the facts which he is acquainted with, partly owing to his own intentional restraint, and partly due to the inherent defects of this procedure. Each teacher will thus add to the diminution of the traditional lore, which, ultimately, having had to pass through a number of selfish and individualistic minds,—as it should have been the case between 700 B.C. and 300 A.D. if we were to account for the internal turmoil of the Hindu society,—has become so deformed and disjointed that it is no wonder we are obliged to take the remnant portions to be of independent and modern origin. However, the most important part of the ancient tradition is not to be so easily destroyed. The Rishis were endowed with sufficient forethought to infer this natural process, and, consequently, took the admirable step of preserving the vast bulk of traditions by "covering" them in the hymns of the Vedas.

But apart from this, it is the height of illogicality to assume that a society which has been famous for mental activity, and which would forego any wealth or prosperity for the sake of meditating on the most difficult and abstruse problems of our very existence simply with a view to reach their ultimate solution, would feel disinclined to pursue the investigation into the realms of physical sciences, a comparatively easy task because it does not require as great a power of concentration and effort as does the former, especially when once its members are on the track, and know that that knowledge would assist them in the proper solution of metaphysical questions. And yet this very assumption ought to be postulated were we to be guided by the decisions of our accredited scholars. This is a fallacy which is against the Principles of Nature as well as logical argument. It is widely held among Scientists that "every new demonstration of a Law of Nature furnishes the basis for a fresh start in a thousand different directions," and therefore there can be "no possibility that, either in the purely demonstrative or in the purely experimental sciences," any society "can ever go backward" before reaching the inevitable limit when once it has taken a start. To this it may be contended that by reason of their peculiar mental constitution the Hindus are "a sort of people" who always turn away from a search into the workings of the physical universe to metaphysical speculations, and that if ever they acted differently, they were prevented from furthering their researches owing to internal convulsions and external aggression, and consequently they could not proceed with their investigation of the Laws of Nature. But we answer that both the arguments are quite out of tune specially in the case of the Hindus. Because, the Hindus are by

nature endowed with an unflinching perseverance and interest in the understanding of all truth whatsoever, and have not, on the authority of their history, restricted themselves to only one mode of thinking and acting. They have walked in every conceivable path and have reached the truest and safest one. If this be admitted, the objections vanish of their own accord, and if not they become irrelevant.

To meet the second of the two objections referred above it should be pointed out that if there is a human society which has adhered to the one ideal in view without deviating from it even by an inch, it is the Hindu society; and how then can we hold that disturbances have affected them and changed their cherished programme? Neither political nor social nor even religious transitions and revolutions have ever changed the Hindus from their altruistic outlook. Why then should we entertain vain doubts and apprehensions? Perhaps, it is due to our complete ignorance of the real nature of the Vedas.

The extant historical and archæological records relating to the practice of applied sciences, such as medicine and engineering, afford us enough facts to substantiate the proposition enumerated at the beginning of this discussion, namely, that the knowledge possessed by the Hindu nation had been degenerating both in extent and quality ever since the beginning of the Kaliyuga. At the time of the Mahābhārata war, there were surgeons capable of effecting speedy cure of dreadful gashes, extract weapons that have pierced deep into various parts of the body, and administer curative medicines for all maladies. But those of the time of Asōka, during whose reign the medical science thrived admittedly better than at any later period, fell very much short of their ancestors in knowledge and capacity. The monumental achievements of the engineering skill of the ancient Indians are still idols of wonder and inspira-

tion to the world at large. The carvings of the Ajanta caves, the "pillars" of Asôka, the awe-inspiring forts and bewitching palaces are a few of the dumb witnesses of the skill, ability, and perseverance of the ancient inhabitants of this soil, to imitate some of which the best of the modern specialists do not dare. In other walks of life, too, the Hindus had attained equally great perfection that justly challenges the inventive powers and speculative imagination of the embassies of "Modern Civilization". How in the face of these and similar facts can we hold that the Hindu nation had been trying to understand something of Nature but failed to proceed in this all-essential attempt owing to transitory and minor causes? We can explain the possibility of the achievements referred above only on the understanding that physical sciences had been fully developed long before the time when, according to moderners, they are supposed to have lifted their heads, and since then the knowledge of these sciences had been decaying instead of being built up. It could not, in fact, be built up any further than the heights it had reached when the Hindu society was at the zenith of its civilization; because the Vedic *Rishis* had reached the extremity of their search into the workings of Nature; and the only way left to their descendants, who like everything else in this manifestation were subjected to the perpetual change, was to take the downward path.

Let us then gather the external and internal evidence as to whether the Vedas are works on the *exact sciences*, or of "childish, silly, even to our minds monstrous conceptions" as Max Müller would have it. It may be objected here that what is said about them by persons of the same doctrine shall not be taken as evidence. Before this is answered let the unbeliever say whether anybody but a Scientist can

speak of science and its achievements. True ; the modern Scientists substantiate their theorems with experimental data that visualise the facts enunciated : but are we justified in accusing the *Rishis* for want of experimental proof, if their puny successors are unable to make it out from their works and apply it producing material results ? To say that we cannot believe them is to deny truth ; and by this procedure we will be the sufferers, not they. Moreover, what has been stated in the Vedas has been verified and attested by persons like *Krishna*, *Vyâsa*, *Jaimini*, *Vasishta*, and *Visvâmitra* who, by the study and utilisation of the principles recorded in the Vedas, have either performed or made others perform prodigies of wonder. Denying this evidence would be denying the case of eye-witnesses to an occurrence.

What is it to us if these personages say thus and thus belonging as they surely do to the same gang ? What hinders us from branding one and all of them culprits and humbugs ? Nothing but the facts of their life-history prevent us from committing ourselves to such a mal-statement. They were men gifted with keen intellect and high ideals, friends of righteous persons, and incapable of doing harm to others by the very nature of their physical and mental constitution. They lacked nothing. One was capable of manufacturing artificial counterparts for most of the natural products. One could bring dead ones to life. One could dictate to the then existing humanity. Others, too, were equally capable, rich, charitable, and unpretentious. How then could we accuse them of having planned a malicious and nasty scheme to throw their fellow humanity into a deep, dangerous, and infernal pit ? Wanting to gain nothing, not even fame, by their actions did they act. How could a black motive be

attributed to them? If at all they had a motive it must be that of doing incalculable good to humanity. What is the position of the present-day Scientists? Why cannot we grant that the position of the ancients, too, was just the same?

“The Purâṇas, the Nyâya, Mīmāṃsa, and Dharma-sâstra, the Vedas with their six Angas, these be the fourteen sources of science and of Dharma.”

“A man should strengthen the Veda by means of Itihâsas and Purâṇas: the Veda is afraid of the man of little learning, lest he should hurt it.”

These statements of Yajñavalkya and others instruct us to depend for the external evidence as to the nature of the Vedas on the Purâṇas, Bhâratam, Mīmāṃsa and other allied works. The author of some of these works, Krishna Dwaipâyana, one of the reputed leaders of the Dwâpara yuga Scientists, has been described by one of his disciples, as being “one who solved, without leaving scope to any doubt, the questions relating to the essential nature of substances (as recorded) in the Vedas”. If this is not the portrait of a highly developed scientific mind, what else can it possibly mean? Is it possible to expect such thought as has come from Vyâsa from a person untrained in science and its method? Add to these that Vyâsa is identified with the compiler of the Vedas. Would it not be the height of irrationality on our part not to give full weight to what is contained in the former kind of works, at least, in so far as they refer to the Vedas?

The Purâṇas are unanimous in extolling the Vedas, and in no place have they spoken ill of them. Not satisfied by merely recording the opinion of the author, they have registered the views of great historical personages. Sceptics of the present age doubt the very existence of these persons.

But is the housewife so stupid as to be deceived if the cat shuts her eyes whilst stealthily sipping at milk thinking that none would find her out? It is a wonder that these unbelievers do not feel their own non-existence, even knowing that they are known only to an insignificant few of this vast humanity, much less than they whom they want to belittle. That these latter were as real as reality itself is more than proved when we understand that the respect which the nation has paid them for their exceptional career has extended, besides in other directions, so far as to determine even the name of a member of a Hindu family to be that of either this *Rishi* or that monarch—a custom which, unlike the individualizing one of the Western nations, has a significant meaning at its back. The Vedas could not have remained intact but for the protection afforded to them and their possessors by such personages. Moreover, they have left their *Sishyas*, if not their works, to bear witness to their once unprecedented career.

We shall now consider a few of the arguments advanced by Jaimini, the author of the *Pūrva Mimāṃsa*, to support the view we have taken here about the nature of the Vedas. While succinctly explaining the relation between the *Rig* and *Yajur Vedas*, *Sāyana* relying on the authority of Jaimini says: "We will grant that.....the *Rig Veda* comes first. Still the *Yajur Veda* is properly explained before it. Because the *Yajur Veda* is most important for the *Yajña*; and it is in order to perform the *Yajña* that we must know the meaning of the Vedas". The point in dispute is why should, as *Sāyana* has done, the *Yajur Veda* be explained prior to the *Rig Veda*? and the answer is the same as that given to the questions, why should experiment precede a generalized theorem? or why should the preparation of the

necessary apparatus and reagents precede the actual experimentation? "The word *rik*", says Guru Datta, "signifies the expression of the nature, properties, and actions and reactions produced by substances." The *Rig Veda* deals with theorems and experiments, while the process of preparing the reagents and apparatus is recorded in the *Yajur Veda* which is, in effect, a laboratory guide. Thus, for instance, the theorem that hydrogen is produced by the action of a metal on an acid occurs in the *Rig Veda*, while the method of preparing the acid is dealt with in the *Yajur Veda*. This is what is meant by Sâyana when he quotes: "The name mantra from manana (inductive and deductive reasoning), the name chandas from châdana (covering)\*, the name stoma from stavana (praising or describing the properties of the objects of physical sciences), and the name Yajus from yajati (to experiment).<sup>†</sup> This being so, the body of the *Yajña*, i. e., experiment, is formed in the *Yajur Veda*, the Veda of the Adhvaryu priest (who "measures out the substances of the *Yajña*"): the hymn and lesson required by the *Yajña* as part of it are filled up by the other two Vedas."

Statements are made such as "in such mantras as '*oshadhe trayasvainam*' the persons addressed are not the things themselves, but the *Devatas* immanent in the things.<sup>†</sup>" This doctrine of the immanent deities set forth by the holy Bâdarâyana in his '*abhimâni vyâpadesas tu*' sûtra, becomes intelligible only if we take *Devatas* to mean the objects of physical sciences.

The Vedas are divided into mantras and brâhmanas. The word mantra is often incorrectly supposed to repre-

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\* Scientific thought covered up in chandas : vide p. 40.

† This is why, in the definition of *Yajña* (experiment), the *Devatas* are spoken of as being separated from things : vide p.



sent a combination of letters whose mere mumbling produces in a miraculous way some extraordinary effect. But Sâyana, with the help of Jaimini's *Sûtras*, refutes this view as follows:— " 'But the meaning of a sentence has the same relation to the words in the Veda as in any other book.' The word 'but' here shows that Jaimini is about to reject the view that the use of the mantras is a spiritual one, lying only in their recitation. The meaning of a sentence is arrived at by the relation of cause and effect subsisting between the words and it, and this holds good of all words whatever, sacred or profane. That being so, just as in common talk a sentence is uttered in order that it may convey its meaning, the same law must be recognised in the case of a Vedic *Yajña* (*i. e.*, experiment). For only the *Yajña* which is illustrated by a mantra *can* be performed, not that which is not so illustrated. Therefore *the recitation of the mantras has one immediate use and one such only*, and that is *not a mystical one*. They are recited in order that they *convey their meaning*." And what is this meaning? It is that which enables us to successfully perform a scientific experiment for the production of material results.

By *brâhmana* is meant a *sâstra* and a *sâstra* is a prescription in connection with an experiment ; or it is an exposition of it. All knowledge that is not included in the mantras which contain the more important facts, is recorded in the *brâhmana*. Whatever is necessary to direct to completion an experiment which is begun on the authority of the corresponding mantra portion is included in the *brâhmana*. It, therefore, contains statements "accompanied by a circumstance in the shape of a direction to the experimenter.....", or a "*parisânkhya*", an "implied prohibition", as in saying take acidulated water (but not pure water), or an "*arthavâda*"

*i. e.*, the "glossary". It contains, moreover, that knowledge which logically follows from the truths of Nature, for instance, the theories of Karma and Māya.

The mantras are useless because they "at the time of *Yajña* express no meaning any more than they do when one is learning them by heart", is the argument which Jaimini controverts in the *sūtra* that "the non-communication of knowledge here is due to the fact that there is no connection with the *Yajña*." From this it transpires that there is a meaning for a mantra which meaning gives us a certain knowledge. The knowledge is obtained not by its mere repetition, but by the performance of an experiment according to the directions embodied in it. There is no super-natural relation here. A mantra is a theorem in modern scientific terminology. Yāska says :—" *Karma sampattih mantrō vede*," which means that a mantra is that which embodies the facts of physical sciences.

"The reference to mantras by a general description shows that the meaning of the text is taken into account." That is, when a verse which has *Agni* (oxygen) for its deity is styled an *Āgnēyi* (belonging to oxygen) verse there must of necessity be a meaning in it.

"The object of the whole body of *āmnāya* or revealed truth is the performance of *Yajña* (experiment)."

"Each karma (*i. e.*, the experiment enjoined in the Vedas) must needs have its reward (or result). Distinctive rewards must therefore, as in daily life, refer to increase in quantity or quality." Sāyana, commenting on this statement, writes that "Victory over (*i. e.*, acquisition of) the one or the other of the three classes of *lōkas*, terrestrial, celestial, and those in mid-heaven, is the fruit (result) obtained by him who performs the "*Pasubandha Yajña*", an experiment in the

Vedas. The true meaning of this is, as will be evident later on, that the performance of the *Pasubandha* experiment with different reagents results in the production of either oxygen (*Prithivi*) or nitrogen (*Antariksha*) or hydrogen (*Divi*). The experimenter who proceeds to experiment with the same kinds of reagents as were used in the first performance of the *Pasubandha* will obtain that substance which resulted in the first case. Here is a quantitative result. But in case the experimenter, following the directions given in a different hymn for effecting the *Pasubandha*, uses quite a different set of reagents which, of course, were known to interact among themselves, then surely the resulting substance or substances will differ from the former one. Here is a qualitative result. Sāyana has:—"The words 'as in daily life' introduce a simile. As in daily life you may buy a *khari* of rice for one *nishka* and then giving another *nishka* get more rice. Or, as one *nishka* will get you cotton cloths, while for two you may get silk. Here you have increase in bulk and increase in quality respectively. In the same way it must be recognized that additional *Yajñas* will produce for the experimenter increased or higher enjoyments."

"Of the Veda, too, some predicate nearness to us in time. There is the mention of men who composed them. Also because we see mention made of things that are not eternal." It is here argued that since Vyāsa is the compiler of the Vedas, they are no more "without beginning" than the works of Kālidāsa and the like writers. But Jaimini refutes it in the *Sūtras* that "the priority of sound has already been declared", that "mention of men is made on account of their teaching", and that "if it were made by a man there would be no mention of the use of the *Yajña*. And also from its identity with the *Yajña karma*." The first of these argu-

ments is plain enough. No sane person could hold that any man has composed the Truths of Nature although we know for certain that they are "covered" in theorems by man. Knowledge is ever there irrespective of time and space, and whether we are cognisant of it or not. None can invent knowledge, but only can discover and record it. But, even in this recording of scientific theorems, Jaimini opines that we should not attribute authorship to man; for he does not create the sounds which make up the words used in their construction. All that he does is to understand and teach the Truths of Nature; and it is on this account that names such as Vasishṭa and Kanva are mentioned in the Vedas. Just as at present a scientific theorem is designated for brevity's sake by the name of the discoverer, and consequently the names of mortals appear in works on scientific subjects, so do the names of men appear in the Vedas. If the Vedas were the creation of imaginative poets how could the universality and immutability of the experiments and their results be known to them?

Sāyana says:—"If the sentences about the 'Jyôtiṣṭôma' were made by man, then the composition of the sentences about the 'Jyôtiṣṭôma' would not have been followed by the *assertion* that that *karma* procures Divi (hydrogen). For no man could have seen that these two *things* stood to each other as cause and effect. But the Veda does contain such an assertion. 'Let him who desires Divi (hydrogen) experiment by the 'Jyôtiṣṭôma Yajña'. Nor can this be said to be like the speech of a mad man. For the *karma* enjoined here is understood, as in the case of precepts in daily life, to be provided with the three factors, the thing to be gained, the instrument, and the method. As in daily life if you say, Feed the Brâhmanas, the question at once arises why,

with what, and how? And the answers are given, 'that they may be satisfied,' 'with rice' and 'with accompaniments such as vegetables, broth, and the like.' So with the command to perform the 'Jôtsishtôma' *Yajña*. Its end is Divi (hydrogen). The *Sôma* (acetic acid extracted by destructive distillation of the *sami* wood) is the instrumental substance used, and the introductory and other subsidiary portions of the *Yajña karma* must be observed. How can this be said to be like the talk of a mad man?"

To those who argue that a spiritual reward is obtained from the study or recitation of the Vedas, Jaimini answers that "where there is a visible reward you must not supply an invisible one", that "the visible rewards are the mastery of the texts and experimental perfection," that "by mastering the text knowledge of the meaning" is obtained, all these "because the injunctions must needs have fulfilment".

"The natural meaning gives a good sense and there is therefore no occasion to force the construction" of any sentence or word whatsoever.

Our confirmed stupidity and perverted imagination have hitherto blinded us to an obvious injunction to search for scientific knowledge in the Vedas contained in these unmistakable syllogistic aphorisms of the forgotten Scientist.

We enter now into a consideration of what the *Mahâ-bhâratam* has to say. Its analysis makes it plain that history, social and ethical Dharma, the science of Self, and other branches of knowledge are ably dealt with mostly in the cloak of metaphor and myth. A consideration of a few statements made in this epic would be sufficient to further establish the scientific character and hence the exacting reverential nature of the Vedas. Almost all the investigators have failed to take the least trouble to view them from a scien-

tific point of view with seriousness and faith. Their interest in them has been a passing one which in the majority of cases is satisfied by the recurring prepossessions about them as being undue exaggerations and poetical licenses. The opening of the *Bhāratam* is characterised by the dictation of a few stories or myths containing a number of absurdities if taken in their literal sense; and that our primitive interpreters take them for their face value, in spite of the overwhelming contradictions to common human experience in Nature, is itself a strong evidence that they are sincerely but childishly foolish. Thus the stories told about *Udaṅka*, *Nāgās*, and *Garuḍa* contain the following facts,—facts they are and nothing less though we cannot understand their hidden metamorphosed meaning as long as we are groping in this impenetrable ignorance: that within and outside this earth, in the atmosphere and high above the skies there are *Devatas* who, though powerful enough by their very nature to preside over the destinies of the fragile millions of this globe, yet are treated as being quite within our reach owing to the fact that their propensities have been completely known by the authors of these stories and through them to such of us as are able to decipher them: that the performance of a *Yajña* according to the directions embodied in certain mantras enables one to obtain a particular *Devata* and secure its good-will, and obtain concrete results which are calculated to gratify the performer's desires with which he began the *Yajña*: that "beings," apparently human, give birth to "serpents," "birds" and other dumb creatures of this manifestation, possessing properties which, if to be understood as they stand, are ludicrous and nonsensical. All these appear to be culpable lies and dangerous deceptions to a superficial and inexperienced mind.

But our sense of right understanding compels us to withhold from formulating this decision, lest in our haste to decry these supposed culprits who, by their other achievements which are guided by their scrupulous adherence to truth, their most liberal ideal of universal happiness lacking which we have become no better than the beast of the forest, their fullness of knowledge which has forced us to voluntarily deify and worship them as so many incarnations of the Being;—by all these rightly extolled qualities have got a right to demand from us a revision of the case, or rather an appeal to a higher authority than ourselves capable of diving into the thick darkness enveloping their statements and discern therein the shining gems, we may hand over ourselves to the succeeding generations as worse culprits and worse impostors than they whom we intend to chastise. The qualities and properties of the *Devas*, whether they are agents possessing bodies similar to ours, or whether what is described about them in the Bhâratam would produce before our mental vision any picture which has an original in the Agents of Nature, are to be understood before all else. Let the reader look deep, combine all the Purânas, go to the Nirukta: and then he will find the real significance of these *Devas*. He will know them to be no other than the Agents of Nature—the same which we know in what we call Chemistry and Physics. There are Agni (oxygen), Vâyu (hydrogen), Indra (electricity), Rudras (radiations from the radioactive matter). There are the Aswins (the cathode and anode rays), the twin brothers. There are the regents of the cardinal points, the *Ashta Dikpâlâs* (the first eight elements excluding hydrogen), with their distinct retinues.

The very diversity and absurdity attending the facts of the Purânic stories must awaken us to a sense of the under-

lying unity and soundness of the statements; for we cannot expect anybody whether civilized or not to indulge in such diversities and absurdities. The characteristic boldness of the assertions of the ancients must arrest our attention and make us ponder over them deeply. We will then find that we alone are on the wrong track, not the ancients. Did we not misunderstand Nature to be essentially a diversity? But has not the idea of a unity in this diversity dawned on us gradually with our increased knowledge of the activities of Nature? Our frames are so moulded as to respond instinctively to variety, not to unity. The mind is in its element when let loose to wander about as it likes, but the moment it is directed towards concentrating on a particular object or idea the heaviness of burden, the imaginary uselessness of purpose drive us to despondence, and force us to take the path of least resistance. We fail to realize that we are born to fulfill some purpose of Nature: and most of us are being led instead of leading, at least, themselves. It is this flaw in human nature that prevents us from looking into things as opposed to looking at their surface. Even the truism that things evil have in them semblances of good is overlooked in this case. If the Hindu is accustomed to relapse at times into insanity, why are we unable to find in their literature of a latter period anything corresponding to the mythological records of yore? The effect of setting aside the prehistoric mythical literature of the different climes, which emanates from the same source and appears mostly in identical garb—nay, almost all the orientlists are of the opinion that “We must learn one day that all ancient traditions disfigured by emigration and legend, belong to the history of India,”—will be to deprive us of an essential factor of our literature, of something without



which we cannot remain contented and happy. We will lose that something which connects the stable and transitional factors of our existence. The chain will be found broken and a number of links lost. But, on the other hand, if we succeed in deciphering that which we are prone to reject and throw into oblivion, we will find ourselves face to face with grand truths that make everything intelligible and solve all doubts hitherto held insurmountable. In short, mythology is the History of the *Devas*: it is the symbolic representation of important scientific experiments.

To instance the mode of interpreting rightly we shall explain the story of Udañka. According to the text, Udañka repairs in search of some treasure. While going through the forest he sees a resplendent personage riding on a divine Ox (*Uksham*). Singularly enough, he partakes of the *Gômayam* (literally, cowdung) of this Ox, and, thereby acquiring the necessary powers and means, succeeds in gaining the longed-for treasure. But on the way, while returning, *Takshaka*, the chief of the *Nāgās* (literally serpents), robs him of the treasure. In the end, however, Udañka propitiates a *Devata* who presents himself to his devotee and enables him to recover the lost treasure. This latter deity appears seated on a very brilliant Horse (the *Arusham* of the *Rig Veda*), accompanied by two ladies who manifest a phenomenon which is decorated by white and dark strings, and six young men who rotate a wheel of twelve spokes.

The author explains this in an equally to-us-mystical language. Says he that the former person is *Indra*, that Ox the *Airāvatam*, and the *Gômayam* which he ate is *Amritam*. The latter person is *Parjanya*, the friend of *Indra*, his Horse is *Agni*\*, the two ladies are *Dhâta* and *Vidhâta*, the dark and

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\* Note that Sâyana translates *Arusham* by *Agni*. Vide p.

white strings are respectively night and day, the six young men are the *ritus* of the year, and the wheel is the year. This is as unintelligible, if not more so, as the original story itself. But is there no way out of it ?

The Samskrit language is distinguished from and is superior to other languages of either modern or ancient growth by virtue of its comprehensiveness, flexibility, and its most scientific grammar which enable us to arrive at the exact meaning of any word whatsoever that we might have lost the significance of. Deriving confidence and hope from this fact, a study of the words used in the above story should be made. The derivations of the synonyms of the word *Indra*, when viewed at with the expectation of detecting the scientific significance, if any, of the term, remembering all the time that these derivations comprise the properties of the object named, will oblige us to admit that they are applicable in the case of what we call electricity and electricity only. According to Yâska *Indra* is so called because he “*produces, gives, or decomposes (drinâti from the root Drî) water.*” *Indra* is also called :—

Bidauja.—Because “he possesses light endowed with the quality of pervasion——dazzling light,”——a well-known property of electric current.

Vajri.—Because “he has *Vajrâyudha.*” *Vajrâyudha* is the lightning, and *Indra* possesses this lightning,——another well-known property of electricity.

Gôtrabhid.—Because “he breaks mountains,” a term applied to lightning. Thus lightning and *Indra* are one and the same thing.

Vrishâ.—Because “he makes it rain.” This is also the

meaning of the expression *Parjanya*. This is a fundamental property of electricity.

*Sachipati*.—Because “he is the husband of *Sachi*.”

*Sachi* is the daughter of *Puloma*, one that has an abundance of hair, for instance, a fur. This has reference to the process of preparing static electricity by friction.

*Mêghavâhana* :—Because “he has clouds as his bearers.”

Moist clouds carry electric charges.

We know that lightning is due to the neutralization of opposite electric charges that are carried by clouds.

These attributes will have any meaning only when they refer to electricity. If *Indra* were some super-natural god, or something other than electricity not cognizable by our senses, none could have predicted these facts in his or its connection. The authors who invented the word *Indra* should have known these properties to be universal and immutable. The terms *Surapati* and *Ribhuksba* mean “the ruler of *Devas*”, and “the director of the actions of *Devas*,” respectively. It has been shown elsewhere that the *Devas* are the objects of physical sciences, such as oxygen, hydrogen, electricity, radioactive rays, and the like. Therefore the two expressions respectively give us the ideas that *Indra* is the chief of the objects of physical sciences, and that through its agency many of the reactions occurring in Nature take place.

The technical use to which electricity was put to in ancient India, may be inferred from the name *Sunâsira* which means “one who propels the plough (in its act of tilling the field.)” *Satamanyu* and *Sûtrâma* are also terms applied to *Indra*, and mean respectively “one who has a hundred *Krat-*

us," and "one who protects the *Lôkas*." A hundred *Kratu*s has reference to a great number of experiments that are successfully completed by the use of the electric current, and the term *Lôkas* stands for the chemical elements, more exactly, the spheres where these elements are found. There are other names which also point to electricity in its one or the other capacity. *Indra*, the cause of the universe, is "the supreme *Devata* according to the *Vedas*." This statement must be taken in the same sense as the one that electricity, the cause of the material universe, is the supreme energy of Nature according to modern Physics.

*Indra* is therefore the electric energy. It will be shown in the fourth chapter that the Galvanic method for producing current electricity is recorded in the early portion of the *Rig Veda*.

Working at the story in this wise, and taking an altogether novel but the only logical and reliable process of investigation, we will eventually reach its inner meaning. To put it briefly, it deals with the X-ray apparatus! Yes; it is so. *Airâvatam* is the electric energy. *Gômayam* is the brilliant pencil of rays originating from the electric current, as in an electric lamp,—*Gô* means a ray of light; *Parjanya* is a name of *Indra* and consequently means electricity. *Dhâta* and *Vidhâta* are the Cathode and Anode rays of the vacuum tube,\* and the *sitakrishna tantu santânâpatam*, the white and dark rings, are the white and dark striations of the tube. The brilliant *Horse* seated on which *Parjanya* presented himself to his devotee, is the X-ray bulb and is known in the *Rig Veda* by the name *Arusham*. Experimenting with these and according to the prescribed mantras

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\* We have already referred to the fact that glass apparatus were used in ancient India, and that the glass made in India was the best.

would bestow on the experimenter what he desires. True. This will sound absurd to some of the readers, but nevertheless this is a matter of fact.

Next in importance are the facts concerning the Astras. What authority have we to put them aside as the habels of children which we have done through our ignorance? Would it not be most lamentable and disheartening were we to believe that, five thousand years hence, the records of the actions of the combatant forces of the present world war\*, the instruments used by either of the parties and the results gained by their use, the tactics and plans of the various theatres of fighting, will be doubted, denied, and attributed to the imagination of the story-telling bards owing to the shortage of material to establish them, the material having been destroyed by foreign influence and repression, and internal turmoil and degradation? This exactly is the position here. That during and soon after the Kurukshêtra war, the aristocracy which formed the scientific circle of Indian manhood, went to destruction without the exception of a single soul by war, intentional renunciation, and the necessary eventful change that time is capable of effecting, is more than demonstrated in the historical portions of the epic. With them all reminiscence of physical sciences and the application of their principles ceased to dominate the minds of the Bhârtiyas. What remained was the unmeaning recital of the codified formulae and enunciations of scientific principles as the extant Vaidikas bear witness.

A reference to the portion of the Bhâratam which deals with the Astras makes it plain that they are not impossibilities; only, we have to view them from the stand-point that they have originated from deep scientific research. That they existed can-

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\* Written during the early part of 1918.

not be denied, since we have a record to that effect. That they depend on science for their very existence is a self-evident fact. Where then is the ambiguity if not in our presumption that we are superior to all those who have preceded us on this planet ?

The Astras are of various denominations—*Vâruṇam*, *Parjanya*, *Āgnéyam*, *Brahmānam*, *Nārāyaṇam*, and others. By the use of *Vâruṇam* one was wont to produce rain wherever and whenever desired. This is equivalent to having control of the water vapour in the atmosphere, or electricity, free oxygen and hydrogen. Similar is the case with other Astras each of which requiring the control of one or more elements. How is this possible if in reality the ancients were unacquainted with the chemical science. It is difficult to explain the use of substances, such as asphyxiating gases used for the *Môhanâstra*, else than by assuming that the person at work has a knowledge of the properties of the substance or substances from which they arise. That the ancients had analyzed Nature to its ultimate principles is the inevitable conclusion thus thrust upon us. Is this not substantiated by the methodic description of the creation, such as follows, given in the *Rig Veda* ? “ Let us celebrate with praise the birth of the *Devas*, in uttered hymns (every one of us), who may behold them in (this) latter age. *Brahmanaspati* blew forth all these like a blacksmith. In the former age of the *Devas*, the existent sprang from the non-existent. In the first age of the *Devas* the existent sprang from the non-existent. Then the different regions sprang from the *Uttânapad*. The earth sprang from the *Uttânapad*; and the regions sprang from the earth. *Dakṣha* sprang from *Aditi*, and *Aditi* (came) forth from *Dakṣha*. For *Aditi* was produced, she who is thy daughter, O *Dakṣha*. After her the *Devas* came into being, beneficent, sharers in immortality. . . . . ”\*

\* R. V. X. 72,1,1-5. Translated by J. Muir. “ Original Sanskrit Texts.” Part IV.

Here the *Devas* signify the objects of physical sciences. Of course, the nomenclature and the method of representation used here are characteristic of the *Rishis*.

It is recorded in the "New India" of the 27th May 1918, that a strange lightning phenomenon was witnessed in Mangalore. It says: "At 11 A.M. or so on Tuesday last week a lightning fell on a tree in the outskirts of the town. Thence it entered a house hard by boring a hole through the wall, appeared in a room where the inmates were taking their food and whirled round the place scalding the arms and legs of four or five people there. It then attacked a child lying in its cradle in an adjoining room. Afterwards it glided into another room, and ended its career by entering the ground, creating a long hole in the floor." The correspondent of the paper also learns that "in its course the lightning came across a brass or bell-metal vessel, which was reduced to a misshapen mass." If this phenomenon had been brought about through human agency it would have been termed, according to ancient Hindu terminology, the *Prayôga of Aindrâstra*; and since such phenomena are not impossible during the present times, there is yet time for us to recover the methods of discharging and pacifying these Astras.

Scholars of both European and Indian descent are of opinion that the literature dealing with these Astras has been irrecoverably lost, and that all we can know of these "fabulous weapons" is from the *Agni Purâna* and *Bhâratam*, the two works which partly deal with military science. But we are not inclined to give into this pretension. We would put a simple question whose answer would veto their decision. How and when did the *Adharva Veda* come into being? Krishna in the *Bhagavad Gita* refers only to the three Vedas, the *Rik*, *Yajus*, and *Sâma*. In the *Upanishads*, too, the same

three are mentioned very often. It is expressly declared that at the end of the Dwāpara Yuga, Veda Vyāsa had sorted up the Vedic literature and divided it into four parts in order that it may easily be memorized. Of these four parts the first three contain all necessary details of experiment, observation, and inference while the fourth part embodies the applications of the scientific principles contained in the other three. In this arrangement, therefore, Bādarāyana has preserved for us the literature dealing with the Astras by incorporating it in the Adharva Veda. The fact that only in some Upanishads there is a mention of the four Vedas, is a proof that Vyāsa after compiling the Vedas thought it best to include the Adharva Veda in their list, lest, at a future time, it should fall to the ground as non-authoritative. The precaution that was being repeated by the writers of the Buddhistic period not to rely on the fourth Veda as it had a recent origin is pregnant with meaning. It firmly establishes that the Adharva Veda is composed of technical sciences only, which were brought together and recorded in a book-form some time when all these sciences had been fully developed. That is to say, that the first three Vedas whose application the technical sciences are, must have preceded the fourth. And one would naturally be inclined to believe that that which we consider to have lost must be present in what we consider to have risen anew. For, otherwise, the scientists of the former age must be reckoned worse than fools. Could any one venture to suspect that they were so lazy and careless as to suffer this vital portion of our Heritage die a silent death? We have, further, references in the Adharva Veda to distinct mantras which, it is proclaimed, will give us the mastery over the Astras.

Some Astras are intimately connected with the radiations



in space. Such, for instance, are Bhâskaram and Parjanyam. When by Parjanyam darkness is brought about, by Bhâskaram it is overcome. These two cannot be had without the control of electro-magnetic vibrations. Our present knowledge of physics and chemistry has revealed to us the existence of an ether, the ultimate basis of matter. We have also inferred that light is a form of energy,—the electro-magnetic energy,—and that it travels in ether. Arguing from this hypothesis, it is not difficult to deduce the possibility of obtaining at will either darkness or light, either cold or heat, provided we have a method and proper instruments. Sir Oliver Lodge writes: "Etherial waves can, therefore, be actually produced by direct electric means. I discharge here a jar, and the room is for an instance filled with light. With light, I say, though you can see nothing. You can see and hear the spark, indeed; but that is a mere secondary disturbance we can for the present ignore—I do not mean any secondary disturbance. I mean the true etherial waves emitted by the electric oscillations going on in the neighbourhood of the recoiling dielectric. You pull aside a tuning fork and let it go: vibrations follow and sound is produced. You charge a Leyden jar and let it discharge: vibrations follow and light is excited.

"It is light, just as good as any other light. It travels at the same pace, it is reflected and refracted according to the same laws; every experiment known to optics can be performed with this electrical radiation electrically produced and yet you cannot see it. Why not? For no fault of the light; the fault (if there be a fault) is in the eye. The retina is incompetent to respond to these vibrations—they are too slow. The vibrations set up when this large jar is discharged are from a hundred thousand to a million per second, but that

is too slow for the retina. It responds only to vibrations between 400 billion and 700 billion per second. The vibrations are too quick for the ear, which responds only to vibrations between 40 and 40,000 per second. Between the highest audible and the lowest visible vibrations there has been hitherto a gap which these electric oscillations go far to fill up. There has been a great gap because we have no intermediate sense organ to detect rates of vibration between 40,000 and 400,000,000,000,000 per second. It was therefore an unexplored territory. Waves have been there all the time in any quantity, but we have not thought about them nor attended to them.

"It happens that I have myself succeeded in getting electric oscillations so slow as to be audible—the lowest I had got in 1889 were 125 per second, and for some way above this sparks emit a musical note; but none has yet succeeded in directly making electric oscillations which are visible—though indirectly every one does it when they light a candle." Further on he adds that "the generation of visible light by electric means *so soon as we have learnt how to attain the necessary frequency of vibration*, will have most important practical consequences . . . . ." Cannot we grant the possession of these means and the necessary instruments to those who had analysed the physical as well as the psychic departments of Nature to their first principles?

Yes: and the probability of the existence of such a state of affairs in the distant past becomes all the more a reality when we critically ponder over what Philostratus says of Alexander's invasion of the Punjab. He says: "Had Alexander passed the Hyphasis he never could have made himself master of the fortified habitations of these sages. Should an enemy make war upon them, they drive him off by means of

tempests and thunders as if sent down from heaven. The Egyptian Hercules and Bacchus made a joint attack on them, and by means of various military engines attempted to take the place. The sages remained unconcerned spectators until the assault was made, when it was repulsed by fiery whirlwinds and thunders which, being hurled from above, dealt destruction on the invaders."

It may further elucidate the nature of the Astras if a reference is made to the view held by Krishna: viz., "the Astras are weapons given to man by *Indra* and others (*i.e.*, agents of Nature) for the sake of meeting out condign punishment to the disturbers of social harmony and peace."

In connection with the story of *Udañka* we had occasion to refer to *Takshaka*, the chief of the *Nāgās*. The *Nāgās* are said to be *Divyayōnijās*—born in the manner in which the *Devas* are born—*i.e.*, the objects of physical sciences. They are therefore not the ordinary serpents for which the commentators have usually mistaken them, but are some kind of physical or chemical entities. Etymologically *Takshaka* means that which *emaciates* (itself), *i.e.*, which undergoes disintegration by itself. It makes its appearance in the story when some result has been gained by the use of electricity and nullifies the effect. What we have to learn from this is that *Takshaka* and generally the *Nāgās* are something of the nature of energy or matter which has the property of undergoing spontaneous disintegration (radioactive matter). Further, the word *Nāgā* is derived thus: "Those that are born in mountains are called *Nāgās*." They are also spoken of as inhabiting under the surface of the earth. We know now that the earth's crust at least up to a depth of "about 20 Killometres" contains widely distributed radioactive matter which is known to undergo

spontaneous disintegration. Besides, radioactive matter is especially found in rocks which are only too well-known to form part of mountains. The terms "born in mountains" and "inhabiting under the surface of the earth," therefore, refer to the radiations emanating from the active matter, not to the snakes. In the story the interior of the X-ray bulb (*aswa* referring to the *Aursham* of the *Rig Veda*) has been designated as the "dwelling of the *Nāgās* (the electronic rays)."

The story of the *Sarpayāga* performed by *Janamējaya* affords us further information as to the nature of this *Takshaka*. The latter is said to have caused the death of *Parikshad* being induced by the *sāpam* of a displeased *Brāhmaṇa*. A *Brāhmaṇa* is one who is well-versed in the esoteric meaning of the *Vedas*—the physical sciences—and also in the science of Self; so that by a *sāpam* of a *Brāhmaṇa* is meant his wish to do injury to somebody, the injury itself being done by the energies of Nature set in motion probably by psychic powers. Hence *Takshaka* must be one of the energies of Nature, or more correctly, the representative of a class of them. What *Janamējaya* did was to attract all these *Nāgās* towards his experimental hall (*Yajña sāla*), where, by some means, they would be destroyed (transformed). But *Takshaka* seems to be one who is intimately related to *Indra*, the electrical energy. The result of the *Sarpayāga* was that it began to attract to itself *Indra* or the atmospheric electricity, and at this stage it was stopped in order to avoid disturbances in Nature. It should also be noted that there was a cure to this "bite" of the *Takshaka*, but the man who possessed it was bribed in order that he may not interfere. What else could the fact that *Takshaka* is an intimate friend of *Indra* convey to us but that the former is an active principle of Nature akin to electricity,

perhaps the active radiations. We also have the Purānic story referring to Rudra as wearing *Nāgās* round his body. Rudra, as will be shown in the sequel, stands for the radioactive matter, and the *Rudras* or *Nāgās* that "attend" on Rudra are the radiations from the active matter.

The Sarpa mukha sara which Karna used against Arjuna was, therefore, a weapon so made that probably its point projection contained this radioactive matter (?). It is certain that it is not the serpent-arrow which is the literal translation of the expression.

Krishna's Visvarūpa, that is, the manifestation of diverse forms, displayed in the court of Dritarāshtra, has been characterized by Duryōdhana and his friends to be the result of *Indrajāla* or the net (woven) of electricity.

In the Udyōga Parva of the Mahābhārata, where Dritarāshtra is introduced as lamenting over the impending destruction of his sons at the hands of Bhīma and Arjuna, his eldest son, in order to convince him of the baselessness of his apprehensions, declares his own capabilities in unambiguous terms. He says: "It is silly that you should regret this my undertaking. I have the power to extinguish an approaching conflagration, to prevent a hail of stones, and to check the progress of turbulent winds. I am also capable of solidifying extensive sheets of water--which he actually did do--and lead my armies over them. I can produce water wherever desired for the use of my armies during their marches. I know how to suppress the wrathful behaviour of cruel beings such as lions, tigers, *bhūtas* and *bétālas* . . . . . And I am not lacking in the practical performance of experiments that bestow various powers. I have propitiated *Agni* (oxygen) and other *Devas* of whom you have just spoken. . . . . " All this, we know, will be received, of

course, erroneously, for much the same worth as the ideas about the zeppelins and hundred-miles' range guns would have been by the men of the tenth century.

Duryôdhana did possess all these accomplishments, but was not trusted with the more important Astras. Even these practically trivial achievements would not have been entrusted to his care but for the fact that he was the heir apparent to the throne of the Emperor of India. His selfish conduct, assuming nature, and his wicked actions and thoughts were the direct causes that deprived him of the higher instruction. But, on the other hand, Arjuna was the pet disciple of Drôna, their common Guru. By his unostentatious demeanour, obedience to his Guru's orders, judicious adherence to Dharma, and unequalled powers of concentration which his mind was endowed with, he secured the good-will of all who were interested in the prosperity of the Royal family. The Guru, after applying a series of tests to discover the true from the false Sishya, was very much pleased to find in Arjuna the only true one who had the courage and strength and intelligence to dare all opposition, and thenceforth he treated him with more confidence, sympathy, and patronage than he did his own son, and gave him valuable Astras which he would not have parted with otherwise. During his discipleship Arjuna became so expert that Drôna was obliged to request of him a boon not to face him in any battle whatsoever. Arjuna kept his word, and later history records no obedience better observed than that shown by this chivalrous personage.

It is this soldier-disciple, who had even then earned the title Vijaya, "The Conqueror," that went to the *âsrama* of the Himalayan Rishis, at the end of a few years after he left his Guru's service, in order to make further researches

into the domain of the science of Astras and thus become the most invulnerable warrior of the impending war with the Kurus. He spent nearly six years in this self-imposed task, and secured almost all the coveted Astras. The feats which he performed with them and the use made of them are succinctly reported in the portion of the epic dealing with the actual battle.

Anybody who has read the work with any care will not fail to notice the chivalrous and self-conscious character of Abhimanyu, a youth aged about twenty-five. He was the son of Arjuna by Subhadra, the sister of Krishna. From about the age of five he was under the constant training of either Arjuna or Krishna who were the two experts of their time in Astra vidya. It is unnecessary to describe here all his many manly actions during the war. The most wonderful of his achievements was the Gândharvi Mâyâ which he displayed just a few hours before he met his death. The mâyâ in question is a convincing proof of a signal proficiency in the science of optics. The young hero, finding himself alone amidst the cunning and malicious horde of enemy-experts, had no other choice but to deceive them by the play of optical images, so dexterously managed as to make every opponent believe that he was fighting with him and him only. There can be no doubt as to the reality of the description inasmuch as fighting in ancient India was undertaken mainly by the members of Royal families each of whom possessed a massive chariot in which there was ample room for the accommodation of the necessary apparatus and instruments. There were, in fact, an electrical machine placed in the centre of the chariot and a *Dhwaja*\* or metallic pole projecting from the roof of the

\* *Dhwaja*, is often mistaken to represent an ensign, but that it, in fact, is not so, is evident from the 4th Verse of the Sundara Khanda, Râmâyana, where it is distinctly mentioned as differing from an ensign. It may be that this long pole was used as a flag-staff besides as a discharger of electric oscillations.

car into the air serving the purpose of the long pole of a wireless installation to produce and transmit electro-magnetic vibrations for the discharge and pacification of Astras. I am not sure whether an instance can be cited where an Astra is discharged during the absence of a *Dhwaja*. There is no reason to disbelieve that the *Dhwajāstambha* erected in temples once served the same purpose.

This Gāndharvi Māyā was taught to Abhimanyu by Arjuna who, it is said, had obtained it after an elaborate research made under the guidance of Tumbura and other Siddhas (accomplished scientists.)

At the beginning of the Vana Parva we are informed that Krishna, on his first visit to the Pāṇdavas after they had been exiled into forests by their cousins, related to them the story of Sambhaka, "a flying town", by way of apologizing for his inability to render them assistance in their need. Sambhaka was a much larger airship than a modern zeppelin. It accommodated a big army and the necessary armaments. It came and attacked Krishna's fort at Dwāraka which was "fully provided with hay, water, grain, and fuel; abundantly equipped with guns and various machines; surrounded by impassable walls of iron clubs; . . . . . and possessing round the fort ditches in which burning coals, sharpened swords and spears, and other means of destruction were implanted broadcast." Then follows a description of the battle. Most of the Astras are here reported to have been used. Of them the *Sabdhabhêdi* terrifies Sâlwa, the owner of the flying machine, and compels him to retreat in an easterly direction. Krishna follows him and ultimately destroys the Vimāna together with all its inmates by the *prayōga* of his "flaming Chakra". These activities, we are told by our civilized unbelievers, are not due to the application of the



Principles of Science; but only the zeppelins and the anti-aircraft guns, which are recorded by their historians, owe their origin to scientific invention. How visibly fallacious!

Writing about the Mayasabha, a work of Engineering and Architecture, which was presented to the Pândavas by Mayâsura whom they had saved from imminent peril, an American critic says: "Such, indeed, was the mechanism of the Mayasabha, which accommodated thousands of men, that it required only ten men to turn and take it in whatever direction they liked." There was also "the steam or fire-engine called Agnirath." "Mention is made of microscopes, telescopes, clocks, etc."\*

The description of the chariot which Krishna secured after killing Jarâsandha, strikingly corresponds to that of a modern motar vehicle.

The account of plant life recorded in the Sânti Parva, forming a discourse between Bhrigu and Bharadvâja, compels us to admit that it cannot have originated from anything other than advanced scientific knowledge. It has again fallen to the lot of a Hindu, Sir J. C. Bose, to restate it with abundant experimental evidence. It is true that the description given in the Bhâratam is quite empirical. But books of the stamp of the Mahâbhâratam, which are intended for the uneducated, cannot and should not include any experimental evidence, save that of common knowledge, within their scope lest the evidence itself should prove to be a stumbling block to the unenlightened minds for whose sake they were written. For its exact proof and statement we have to probe in the Vedas themselves from which these works have evolved. Has any one carried on such investigation? Why then should we form our opinion simply by looking at the face of things?

\* Hindu Superiority.

The slokas have the object of establishing that plants, like animals, are living beings having a nervous system and capacity to feel. When rendered into English they run thus:

“The substance of which trees are made up is undoubtedly (due to *Âkâsa*,) *i. e.*, the ether. The manifestation of their fruits and flowers is always brought about by chemical change.

“Through heat the bark, fruits, and flowers (of trees) fade away. The casting of leaves and the decay of bark are indubitably due to the sensation of touch.

“Thunder impares flowers and fruits. Sound is received through the sense of hearing. Hence trees are said to hear.

“Trees have the power to smell as they are known to be freed from disease and then to flower by (the administration of) various sweet and foul smelling incenses; they, therefore, have the sense of smell.

“Since trees suck up water by means of their roots, and since they are known to be attacked by disease which is cured by medicine, we know that they have the sense of taste.

“Because they experience both pleasure and pain, and germinate again when they are cut down, we understand that trees have life.

“Because a tree has life, it digests the oxygen (*Agni*) and hydrogen (*Mâruta*) (of) the water that has been sucked by it: and this transformation of food makes the tree grow.”

In these statements is involved a knowledge of the changes attending the performance of definite experiments. It presupposes the method of inductive reasoning, and

analysis of facts and phenomena. The statements are quite general and applicable to all trees. In the first sloka the theory that all matter has arisen out of ether is hinted at. The fourth and the fifth slokas give us information which modern science has but partly demonstrated yet. In the "Vriksha Āyurvēda" a number of diseases affecting particular kinds of trees and their remedies are set forth at length, of course, in the old Hindu fashion, and they well deserve a trial at the hands of our experimental scientists. In the sixth sloka we find a definition of life. The processes of response to stimuli, and development and recuperation in the organism through respiration and transformation of the food absorbed from without into the substance of the organism, is known as life. Modern scientific definition is substantially the same. In the last sloka we learn that the water absorbed by the tree is utilized in the building up of the body of the tree. In the first sloka we are told that the development of trees takes place through chemical change, and in the last we are informed that water takes part in this chemical change. The case is certainly one of hydrolysis in modern terminology. The *Rishis*, it is thus evident, knew the modern theory relating to the growth of plants and trees: namely, that by means of the life in trees (*i.e.*, the protoplasm) hydrolysis takes place in the body of trees transforming certain substances which go to build up their bodies.

The perfect number seven, around which there is a so-called mystical meaning, is often met with in the *Purāṇas* in connection with great mishappenings in Nature. Hitherto, it has been the custom to overlook the fund of meaning which the ancient Hindus attached to it but the same will hold no longer. The seven *Rishis* are either the discoverers of the last seven elements of the first short period of the Periodic

Table, or are the very elements themselves. The word *Ashta-Dikpālā* has a totally different meaning from what is usually given to it. *Ashta* is, of course, eight. *Dikpālā* is a compound of two words, *dis* and *pālā*. Generally *dis* is taken as a noun and *pālā* as a verb. But taking *pālā* as a noun and *dis* as a verb, we get the meaning "to explain the rows or ranges" for *Dikpālā*. Admitting the validity of this derivation,—and there is no reason why we should not inasmuch as we are enjoined to depart from the usual path,—we will have to take *Ashta-Dikpālā* to mean those that explain the eight rows, or better those that explain the table of eight rows. Aye, this table of eight rows is the very Periodic Table of Mendeleeff's classification.

Verses 5—9. R.V. X. 72, have been translated by J. Muir thus: "5. For Aditi was produced, she who is thy daughter, O Daksha. After her the *Devas* came into being, beneficent, sharers in immortality. 6. When ye, O *Devas*, stood, strongly agitated, in that chaos, there was a violent dust (nebulous matter) issued forth from you, as from (persons) dancing. 7. When ye, O *Devas*, like devotees (or strenuous men), replenished the worlds, then ye disclosed the sun who had been hidden in the chaos. 8. The eight sons who were born from the body of Aditi,—with seven (of these) she approached the *Devas* but cast away (the eighth) *Mārttānda* (the sun). 9. With seven sons (only) Aditi approached (the *Devas* in?) the former age. Again, for birth as well as for death she disclosed *Mārttānda*.\*

Add to this the description of the birth of the eight *Devas* (elemental substances) given in the *Satapatha Brāhmaṇa*. "Aditi (hydrogen?)", it runs, "had eight sons. But there are only seven (*Devas*) whom men call *Āditya Devas*. For she

\* Muir's Samskrit Texts, Part IV. p. 11.

produced the eighth, *Mārttānda*, *destitute of any modification.*" *Mārttānda* is the sun. We know now that around the sun there is an immense quantity of incandescent matter termed its chromosphere, and that this contains the element helium *which is destitute of all chemical activity*; and it was believed for "twenty-seven years" that it existed only in the sun. This then is the link. The *Devata* who is destitute of any modification and who is termed the sun, is this very helium. Curiously enough the Greek word Helium means the sun! This coincidence of the terminology merely shows that the method of investigation into the Principles of Nature is unique and the same for all time, and that the method of representation employed by the sages of India is unconsciously followed by our modern scientists in the present case.

The text goes on to say: "He (*Mārttānda*) was smeared (electrified) all over: of the dimensions of a Purusha (atom), as broad as long some say (i.e., spherical). The *Âditya Devas* (elements other than helium) said, 'If in his nature he be not conformable to us, then it will be unfortunate; come let us alter his shape.' Thus saying they altered the shape of the Purusha (charged helium atom). When his *māmsa* (i.e., the electric charge, because *māmsa* is that which gives him strength and speed) was completely removed (literally, *kritya* means "to be seduced from alliance") and abandoned,—i.e., when the atom lost its positive charge,—there sprang a *hasti* (helium)..... He whom they then altered was Vivasvat (the sun), the son of Aditi, from whom these creatures are descended." \*

This clearly shows that the *Mārttānda* is the charged helium atom. The term *hasti*, that which possesses (the property of assuming the form of) a ray, is intended to denote

\* Satapatha Brāhmaṇa 3,1,3,3 ff. Translated by Muir.

The *Ashtadikpālas*, therefore, represent the eight elements of the first period of Mendeleeff's Periodic Table, not the supernatural deities dwelling in the eight cardinal points. The first two periods of the Table are :—

(Aditi)

(Mārttāṇḍa)  $\begin{array}{cccccccc} & \text{H} & & & & & & \\ \text{He} & \text{Li} & \text{Be} & & \text{B} & \text{C} & \text{N} & \text{O} & \text{F} \\ | & & & & | & | & | & | & | \\ \text{Ne} & \text{Na} & \text{Mg} & & \text{Al} & \text{Si} & \text{P} & \text{S} & \text{Cl} \end{array}$

The first short period here is the one beginning with He and ending with F. Mārttānda is the first element,—He.

The terms "Trikapāla", "Aṣṭākapāla", and "Ēkādasakapāla" which occur in the Vedic literature, and which are misinterpreted by the mediæval as well as the modern schools of commentators to represent three, eight, and eleven cupfuls of ghee, stand in reality for the three-rowed, eight-rowed and eleven-rowed tabular arrangement such as the one given above.

Besides, an order into which the number seven invariably enters characterizes a number of the Laws of Nature, at least during the elementary stages of their enunciation. "The seven orders of spectra, the seven notes of the musical octaves, and the seven chemical elements, together with the seven vertical groups to which by their periodic repetition they give rise, of the 'period' of Mendeleeff's classification of the elements," and the seven systems of symmetry of the crystal world are points giving it such sacredness as the Hindus are accustomed to display. Indeed, the seven notes of the musical octaves are the seven celestial 'nadis', nad meaning to sound; the seven elements are the seven *Devatas* just referred to excluding Mārttānda, the eighth; the seven vertical groups are the seven 'lōkas' of the Dikpālas; and the seven orders of spectra are the seven 'horses' of the *Devas* and so on.

Saptahayaḥ is one of the names of the sun. Saptahayaḥ means one "who has seven horses." No stretch of imagination could have induced the poet to infer that the sun has seven horses. One may argue that the poet may have deduced it from his knowledge of the phenomenon of the rain-bow. But that supposes a more advanced stage of knowledge than that required to analyze sun's light; for the poet could not have guessed that the rainbow is caused by the sun's rays. If he did he would not have failed to

understand the actual relation subsisting between the light from the sun and the rain-bow. The phenomenon of the rain-bow is explained, even in the course of the development of modern science, only after the analysis of light has been previously effected. Moreover the general idea of the Indian masses and the Indian poet concerning the rain-bow is that it is the bow of *Indra*. This does not throw any light on the connection between the sun and the rain-bow. The only possible explanation is that long before Newton's time, the *Rishis* of India had analyzed white light into its most apparent seven components. Further, the term horse (*haya*) has a significant etymological meaning to offer. It is derived from *hai* which means to move, so that *haya* means that which moves. According to the *Nirukta*, terms such as *haya* are used in the *Vedas* to convey the root idea connected with them, not their 'laukika' meaning. In the present case, therefore, *haya* does not mean an actual horse but something which moves with a very rapid speed—a ray of light.\*

There are yet other facts such as those dealing with the evolution of the universe, the birth of a man from a *Yajña*, and the giving of life to a deceased person abounding in the *Purānas*, for which no serious explanation has been advanced, and we may even doubt whether it has ever been contemplated. To say that they are the representations of a diseased imagination is neither logical nor manly. We must concede to them as much reality and importance as we do to any other fact reported in the *Purānas*; for we have no freedom to allow our own liking or disliking of certain historical facts to run as it lists, while representing them to the public. It may

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\* Pundit Guru Datta writes that the word *ashwa* " does not mean horse only but it also means the group of three forces—heat, electricity, and magnetism."



be judicial criticism according to some, but, at the same time, we must remember that such critics are in honour bound to acknowledge their innocent ignorance in case they fail to make them out, before trying to persuade credulous and misguided people to reject them altogether. Perhaps the assumption that the authors of these works were barbarians little better than the apes in the wilderness, is the root cause of this unmerited unbelief. There is in it also, may we venture to say, a good amount of reluctance which is characteristic of human nature, preventing us from acknowledging the superiority of others to ourselves.

Almost all the investigators suffer from the lack of that enthusiasm, the result of self-consciousness, which alone is capable of revealing the true nature of things. All that they wanted to know was to see how far these "primitive nations" had advanced in the scale of evolution always being guided by the idea that, however much they might have advanced, it could not have been up to even a thousandth part of the present advancement. They wanted to survey the similarities and dissimilarities between these "primitive nations," and then compare the growth and decay of one with the other. They tried to establish that this or that nation had been the source of this or that knowledge which was bought or adapted or stolen by that or this nation, an unprofitable job inasmuch as it deals with something whose real magnitude and meaning could not be known to them. And lastly they wanted to collect that evidence which, in spite of their own inner consciousness, they would like to adduce, after a series of protracted procrastinations, in favour of establishing that these ancient nations did possess certain empirical knowledge, but which, when compared with their own, looked so insignificant as to dwindle away like a candle light in the

brilliant radiance of the sun. Alas! none of these miners working in these diamond mines, have equipped themselves with that search-light which would reveal the real from the false diamond, by enabling them to catch the glimpse of the reflected rays! But, instead, they have covered themselves from top to toe with a warrior's armour, as dark as darkness itself, fearing that explosions and pitfalls may present themselves which, though intended by Nature to bring the true diamond to the surface, are mistaken to be intended to do them harm by first shaking their footing, then giving them uncertain footing, and ultimately throwing them into the abyss of forgetfulness. But for this any of them would have acknowledged long ago that our present scientific knowledge is insufficient to explain *all* the grand scientific truths maintained and advocated in the Purânas and other allied works.

It is not necessary to add more facts from the Purânas. When we compare the civilization delineated in them with our own, we find that with all the boasted modern science, ours is but a regeneration from the mighty wreck of the Vedic civilization. When these works speak of Vimânas, Pushpakas, and flying towns; of Visvakarman, the personified architect of the *Devas*; and of Krishna's Chakra—they appear in the eyes of these investigators to be silly and childish dreams. But when they are informed by their historians that they have air-ships, electricity, and torpedoes, they take them without the least demur. That they would not be convinced, even with the astounding evidence recorded in this volume, of the fact that a civilization far ahead of their own did exist in the Golden Age of yore, is the basic germ that has generated and fostered this contagious unbelief.

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## CHAPTER III.

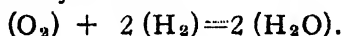
### INTERNAL EVIDENCE AS TO THE NATURE OF THE VEDAS.

**F**URTHER evidence—The fallacy of the statement that the Hindus were not acquainted with the analytical method of investigation—Rishis—Scientists—Smṛiti—Sruti—Two kinds of knowledge, Dharma and Brahma, or science and religion—Passages from the Upanishads calculated to help us in deciphering the Vedic nomenclature—The statements that

Prithivi + Dyau give rise through the action of electricity to rain, and,

Agni + Âditya give rise through the action of electricity to water, are equivalent to the modern one, namely,

Oxygen + Hydrogen give rise through the action of electricity to water.



In the last chapter we have given some of the salient facts of the Bhâratam and Purânas, and endeavoured to show that the civilization they depict must be supposed to have been superior to the present one in all respects of comparison. We now proceed to substantiate this remark by the evidence from the Vedas. The direct internal evidence as can be gathered from the Srutis, and the indirect internal evidence as found in the Smritis, Mīmāṃsa, Vaisêshika and Nyâya branches of Hindu philosophy, throw down each a gauntlet at our opponents, who have deceived themselves as well as others by over-confidence in self-assumption and race-superiority. Jaimini has very ably set forth all necessary reasons, which convincingly demonstrate the view taken in the foregoing chapter about the nature of the Vedas. His argument is so natural and straightforward that it leaves in

our minds neither suspicion, nor doubt, least of all a denial of his conclusion that a hidden purpose exists in the Vedas, the knowledge of which gives the knower every power with respect to the material universe. What but the physical sciences could afford such power? Cannot we understand that when stones and trees are said to perform *Yajñas*, it is meant to denote the radiations emanating from active substances, and the chemical changes taking place in the trees; that when it is stated that the performance of prescribed *Yajñas* would result in procuring immediately, and here on earth, either "Prithivi, or Antariksha, or Divi," these terms cannot have any meaning unless they are taken to stand for chemical reagents; that when *Indra* is praised as residing in the sky being the supreme lord of the *Devas*, and giving us plenty of rain and other desirables, it is another name for the atmospheric electricity; that the *Maruts* are no other than the active rays moving in space and having the property of ionizing the gases of the atmosphere; that the *Rudras*, as their many properties bear testimony, are nothing if not our much valued radiations from the radioactive substances; that the *Aswins*, the twin-born doctors of the *Devas*, are merely the Cathode and Anode rays; and in fact that the *Aswamedha Yajña*, misinterpreted as "The Horse-Sacrifice", is no other than a grand experiment in which the X-ray bulb plays an important part.

The Hindus are generally supposed to be completely devoid of analytical and experimental methods. How then devoid of them they were able to analyze the physical and psychical worlds, which may be gathered from the *Vaiseshika*, *Nyâya* and other philosophies, is the wonder to solve which an attempt is made by considering that the *pancha bhûtas*, mentioned in them and elsewhere, are only the five states of

matter. What a misleading statement ! Agni, Vāyu, Āpah, and Prithivi are *Devatas* worshipped by the Vedic Rishis. Knowing that they are separate entities, possessing distinct vocations and properties, and above all, each having a distinct individuality which is characterized by being fully concrete and in no way an abstract idea, our learned interpreters explain them as the five states of matter. That these works contain ideas and concepts which even to the twentieth century scientists are too advanced, does in itself establish that their authors must have known all this our science and much beyond it : for these concepts must needs be more fundamental than the fundamental ones of our day in order that they should defy the reflective and receptive faculties of our minds. Why then should we attribute want of analytical and experimental methods to the Vedic Rishis, merely because we cannot understand what they say ? Is it too much to say that we are just in the shoes of the fox in the fable of the fox and sour grapes.

Apart from the inadequacy of this blind belief,—it can no longer be called a controversy,—to explain the grand scientific conceptions often occurring in the sacred literature of the Hindus, it is untenable inasmuch as there can be no synthesis without previous analysis. In all enquiry it is the analytical faculty of human mind that finds application at the outset. We have no right to assume that a process antagonistic to this of Nature, was in vogue in ancient days. The most plausible explanation of this misjudgment is to be found in the fact that that part of the Hindu literature which has been partly studied, presents to us mostly the synthetic side of the Hindu mind, and that the little of the analytical side which could not but come to surface along with it, has been ignored or mistaken. Probably to this must be added the fact that

the majority of investigators were guided by the feeling that all researches into the ancient Samskrit literature, are useful only by way of arousing interest for archæological research and encouraging its study. But, if one goes through the Upanishads with any seriousness and interest, he will, without fail, be confronted with an immense number of facts that cannot be understood else than by the application of the results of the analytical method with which we are acquainted. Instances are by no means rare in the same records, which conclusively prove that the teacher of the ancient days, followed more or less the same method of instructing pupils as our Scientists are known to follow with all the analytical and synthetic processes at their command. There is however, a solitary difference : namely, the ancients laid more stress on developing the direct interest of the student than we do at present. Consequently, they achieved more valuable results than what we have been able to reap. The stories that tell us how Satyakâma Jâbâla and Upakôsala Kâmalâyana acquired a knowledge of the secret meaning of the Vedas may be cited as two out of a number of such examples.

The Vedic literature extending over the Samhita, Brâhmana and Sûtras, is named Sruti. Sruti is that which was heard from the Rishis. "But who are the Rishis? Rishis are even inspired beings, who, long before all of us, desiring this (knowledge) and with toil and concentration, separated it (from falsehood.)" \* This is the reason why the sacred

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\* This is further explained in the Mahâbhârata, Sânti Parva, where Bhishma is introduced as saying: "The wheel of Time countenances no exceptions. By it creations and destructions are moving. During Pralaya, the Paramâtma unites with Prakriti, and evolves everything at the beginning of a new Kalpa.

"And during the course of evolution, scientists (Munis) are born along with the multitude of living beings, and obtain through the Divine grace of the Almighty all the Vedas and Sâstras which had perished during the Pralaya."

literature of India is called the "*revelation*." It was not the creation of the *Rishis*. The *Rishis* were only the passive recorders of Natural phenomena. Nature revealed herself to them. All that they did was to watch Nature and wait for inspiration which dawned on them suddenly and little by little. They are also termed "*mantra-drashtas*",—those who have *seen* that which is contained in the mantras or theorems. To explain this term fully we give here an instance from the life-history of a modern Scientist, Kekule, who discovered the law of *the linking of the carbon atoms*. "The genesis of this idea of Kekule's," writes an author, "was singular. He tells us that it came to him more or less as a dream. As he was sitting half-asleep by the fire, he seemed *to see* the atoms executing a mazy dance, till suddenly some of them separated themselves into chains, while others joined themselves into rings. He sat up all night working out the consequences of this dream. Very briefly it came to this, that if we consider a single carbon atom with its tetrad valency, etc." *Mantra-drashta*, therefore, means this kind of "*seeing*,"—discovering. What "*ibid*" records of the "great pioneers of science" is applicable, word by word, to our *Rishis*. They "have been men of ideals, whose imaginations were regulated by education and chastened by wisdom. They have been men of courage and perseverance, who followed out their convictions through every discouragement. They have been men of entire truthfulness, who have never hesitated to submit their doctrines to the test of crucial experiments, and to abide by the issue. They have been men of the most scrupulous conscientiousness in attention to minute details, regarding themselves as responsible to the Giver of all truth for accuracy in every observation, and for exactness in every statement. Finally, they have been men

of modesty and of reserve in judgment, realising, as no other men ever have, how boundless is truth, how limited knowledge, how intricate the problem of Nature, how weak in comparison the intellect of man."

That which has been perceived by such men in respect of the workings of Nature, and repeated to others is termed *Sruti*. What wrong or ambiguity is there in calling science *Sruti*? for all that the common people know of science is what they have heard from the "mantra-drashṭas."

*Smṛiti* is also called *Dharma samhitā*. "It is that which has been *created* by the *Rishis* in accordance with the deliberations or reflections arising from an understanding of the meaning of the *Vedas*." And *Dharma samhitā* means "that in which *Dharma* has been collected and arranged." It comprises of the various *Dharma sâstras* of which *Manu's* "*Mânava Dharma Sâstra*" is the prominent one. Says *Manu*: "He (*Brahman*) it is who, enveloping all beings in a body composed of five elements, causes to pass through successive stages of birth, growth, and dissolution, with a movement like that of a wheel." "Some worship him in *Agni*, some in *Vâyū*; he is the lord of creation, the eternal *Brahman*." These two passages show that the *Dharma sâstras* presuppose the existence of the *Vedas* and proceed to apply the Laws of Nature to the case of human societies.

The evidence from the *Sruti* is of a direct nature. It is here drawn from the *Vedas* and *Upanishads* only. The *Adharva Veda* contains verses such as follow:

"He who has penetrated the secrets of things, who has lifted himself up by *contemplation* to the *knowledge* of the immortal principle, who has mortified his body and developed his soul, who knows all the mysteries of being and non-being, who has studied *all the transformations* of the vital molecule



from Brahman to man and from man to Brahman, he alone is in communication with the *pitris* and commands the celestial forces.' "

" "Nothing is commenced or ended. Everything is changed or transformed. Life and death are only modes of transformation which rule the vital molecule, from plant up to Brahma himself.' "

These passages sufficiently enlighten us as to the kind and extent of the Vedic knowledge. We cannot escape here by remarking that they are childish or even metaphysical speculations. The tone, the underlying authoritative spirit, and the dignity of principles advocated in them, compel us to infer an experienced author who knows them to be true, having himself experimentally tested them. No children can speak in these terms, nor even our leading scientists. The latter are far behind the ideal state hinted at in the foregoing citations.

The Veda is "that which enables us to know the uncommon means to derive good and ward off evil." "The Veda can make clear what has been, what is, and what is to be, what is near and what is afar off." "By Veda they know that means which is not understood by perception and inference." "Perception is not a cause there because perception deals with *things that are*, not with *things that are to be*." "Whatever is desired will be accomplished by (the knower of) the Veda. Nothing impossible exists." The present scientists have not declared yet the power and value of their scientific knowledge in these emphatic terms, since their *tapas* has not been of the highest order. "By *tapas* is meant that grandeur of the intellect wherein complete severance from all worldly pursuits, or objects of senses, is maintained. And he who is firmly established in *tapas* has no other duty than that which leads him to the attainment of his goal." It is further re-

marked that "to carry on practical experimentation (*hōma*) and mental contemplation (*japa*) according to the dicta of well established theorems (*siddha mantras*) is *tapas* : and by this *tapas* peace of mind and greatness are obtained. The actions, such as curing diseases and destroying enemies, of him who is gifted with *tapas*, are easily accomplished. For whatever purpose are the *Devatas* invoked, that is surely fulfilled."

A few passages from the Upanishads will now be given. Max Müller, in his "Introduction to the Upanishads," rightly expresses his opinion that ".....I know full well how much still remains to be done, both in restoring a correct text and in discovering the original meaning of the upanishads ; ..... ." Upanishads are auxiliary works of the Vedas, intended to reveal their inner nature. They therefore contain the so-called mystical formulæ, directions for experiments, lists of the technical terms of the objects of physical sciences and their properties as the authors knew them, along with certain directions and injunctions for the right understanding of the Vedas. They also contain an abridged science of Self. They form a key to the Vedas and a short summary of the main principles embodied in them.

According to the Mundaka Upanishad, there are two grades of knowledge : "Two kinds of knowledge must be known, that is what all who know Brahman tell us, the higher and the lower knowledge." There is no ambiguity in this statement. The Hindu mind has, from time immemorial, been accustomed to recognise two different kinds of knowledge, one having the physical senses and intellect, and the other intuition and consciousness, as means of perception and understanding. The former is called Dharma and the latter Brahma. By Dharma we understand those guiding Principles

of Nature which manifest during the process of evolution. In other words it is the sum-total of Natural Laws ; and this knowledge is "the Rig Veda, Yajur Veda, Sâma Veda, Adharva Veda, Siksha, Kalpa, Vyâkarana, Nirukta, Chandas, Jyôtiṣṭa." "But the higher knowledge is that by which the indestructible (Brahman) is apprehended." Dharma and Brahma are respectively the subject matter of Science and Religion.

The nomenclature used by the Rishis is altogether foreign to us ; and this is the reason why we have failed to make out their teachings. In the *Bṛihadâraṇyaka Upanishad* is recorded a discourse, which ensued in the laboratory of the renowned Janaka Vaidêha among the leading scientists of the age, who had assembled there to assist Janaka in his performance of the *Aswamedha Yajña*. We give here the first part of the ninth Brâhmana, IIIrd Âdhyâya, with a view to enable the reader to form an idea of the terminology used by them.

1. "Then Vidagdha Sâkalya asked him : 'How many *Devas* are there, O Yâjñavalkya ?' He replied with this very Nivid : 'As many as are mentioned in the Nivid of the hymn of praise addressed to Visvêdêvas, viz., three and three hundred, three and three thousand.'

'Yes', he said, and asked again : 'How many *Devas* are there really, O Yâjñavalkya ?'

'Thirty-three,' he said.

'Yes,' he said, and asked again : 'How many *Devas* are there really, O Yâjñavalkya ?'

'Six,' he said.

'Yes,' he said, and asked again : 'How many *Devas* are there really, O Yâjñavalkya ?'

'Three,' he said.

'Yes,' he said, and asked again : 'How many *Devas* are there really, O Yājñavalkya ?'

'Two,' he said.

'Yes,' he said, and asked : 'Who are these three and three hundred, three and three thousand ?'

2. Yājñavalkya replied : 'They are only various combinations of them, in reality there are only thirty-three *Devas*.'

He asked : 'Who are those thirty-three ?'

Yājñavalkya replied : 'The eight Vasus, the eleven Rudras, the twelve Âdityas. They make thirty-one, and Indra and Prajâpati make the thirty-three.'

3. He asked : 'Who are the Vasus ?'

Yājñavalkya replied : 'Agni (oxygen), Prithivi (ozone), Vâyu, Antariksha (nitrogen ?), Âditya (hydrogen), Dyau (helium), Chandramas, the Nakshatras, these are the Vasus, for in them all that dwells (this world) rests ; and therefore they are called Vasus.'

4. He asked : 'Who are the Rudras ?'

Yājñavalkya replied : 'These ten *Prânas* and *Âtma*, as the eleventh. When they depart from this mortal body, they make us cry (*rôdayanti*), and because they make us cry they are called Rudras (radiations from active matter).'

5. He asked : 'Who are the Âdityas ?'

Yājñavalkya replied : 'The twelve months of the year, and they are Âdityas, because they move along (*yanti*), taking up everything.....'

6. He asked : 'And who is Indra, and who is Prajâpati ?'

Yājñavalkya replied : 'Indra is lightning, Prajâpati is a *Yajña*.'

He asked : 'And what is the lightning ?'

Yājñavalkya replied : 'The Asani (electricity).'

He asked : 'And what is the *Yajña* ?'

The identity of the alpha-rays with the *Indradyâhi* of the *Rig Veda*—Radiations from the active matter, especially the alpha-rays are the source of all life on this planet—Organic chemistry—The preparation of alcohol—The production of aldehyde from the alcohol—The identity of the Purânîc *Vritra* and alcohol—The cyclic progress of human civilization.

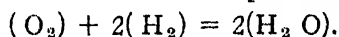
We have had two versions of a single phenomenon which the average reader may be expected to know : namely,

Prithivi + Dyau = rain, combination taking place  
through Parjanya (Indra),

Agni + Âditya = water, combination taking place  
through lightning.

The modern version of it is :

Oxygen + Hydrogen = water, combination taking  
place through electricity.



If these statements are the expressions of one and the same phenomenon or experiment, we must have,

1. Prithivi = Agni = Oxygen,
2. Divi = Âditya = Hydrogen,
3. Rain = Water =  $H_2O$ ,
4. Indra = Lightning = Electricity.

Equation 3 requires no explanation except that  $H_2O$  is the chemical formula for water. Equation 4 has been explained already.

That in the writings of the ancient Hindus there is nothing to enable us to infer that they were acquainted with oxygen and its uses, is the argument of the "Neo-Indians" and the adepts of modern civilization. To them the terms *Prithivi* and *Agni* can never mean the substance oxygen but only earth and fire. It is, however, strange even to them that fire (*Agni*) and the sun (*Âditya*) should be referred to as producing water, and that

through electricity. But they console themselves by, and silence others into, believing that the statement has arisen out of mental dyspepsia.

Such is not our procedure. Since the synonyms of a word are, in the Samskrit language, the articulate expressions of the properties of the object named, we may very well ask our readers to consider those of Agni, and deduce its correct bearing. The following are some of the names of Agni.

1. Vaiswânara :—because “he (Agni) is the son of the Rishi Viswânara.” It is not unoften, even in modern scientific works, that a discoverer of a thing is figuratively termed its father.
2. Kripitayôniḥ :—because “water is the place of his birth, i.e., his source,” or because “he is an origin of water.” Some are inclined to believe that when it is said that “water is the place of his birth”, or that “he is an origin of water,” the “he” refers to lightning. This, however, cannot be the real meaning. Because it is distinctly stated that Agni and Âditya combine to form water, and that Agni is a product of decomposition of water (*R. V. I. 1, 1, 3.*) Further the term Indra which is used to denote electricity, and consequently is designated as “the owner of lightning,” is spoken of not only as the producer but also as the decomposer of water. And since Agni is not a synonym of Indra, it is irrational to suppose that it stands for lightning instead of oxygen.
3. Jwalanah :—because “he inflames (a glowing splint).” This is a property of oxygen known even to the beginner in chemistry.
4. Jâtavêdah :—because “the Vedas are born from him,” or

because "he is found in all bodies that are born." It is only too well known that many of the chemical laws are due to oxygen. Oxidation is the process of combination with oxygen. Without oxygen chemical philosophy could not have reached the dimensions that it now possesses. Agni is further described as "found in all bodies that are born." Every living being requires oxygen to keep up its bodily combustion. Without oxygen there can be no growth of the body. If Agni meant fire, it could not be said to be the source of science, and that it is found in all bodies.

5. *Tanûnapât*:—because "he maintains our bodies", or because "he maintains himself without fuel." If Agni does not mean oxygen the property that he maintains himself without *fuel* (wood) could not have been attributed to him.
6. *Âsrayasah*:—because "he feeds on his patron." The meaning is that Agni oxidizes. This is the reason why he is called *Athithi* in the Vedas.
7. *Krisânuh*:—because "he reduces the quantity of the substance on which he acts." In other words, it oxidizes transforming the substances.
8. *Analah*:—because "by him all beings live." This is a complete proof that Agni means oxygen only, not either fire or lightning. It surpasses all expectation that any man with a little common sense, and least of all the "primitive man," who had only just then acquired fire and learnt the art of making its use, should say that all beings live by fire. It is all the more improbable since, according to our opponents, they were aware of the contemporary aborigines who,

probably, had not seen fire even once in their lives.

9. Vâyusakha:—because “he is the friend of Vâyu.” It will be shown in what follows that Vâyu occurs in the Vedas as a name of hydrogen, and since oxygen unites with hydrogen the former is called the “friend” of the latter.

10. Saptârchi:—because “he has seven *archis* (spectra).” It is experimentally proved that oxygen is “capable of giving no less than seven spectra.” The spectrum of a gas is obtained by passing a current of electricity through the rarefied gas in a spectrum (Geissler) tube. The spectra of gases other than oxygen, do not change much with alterations in the degree of rarefaction. But in the case of oxygen the degree of rarefaction has a marked effect, and observations have shown that “no less than seven different spectra” are obtained each for a definite value of rarefaction. The term *archi* is different from *aswa* which, as we have shown, stands for a ray. The word Saptahaya signifies that there are seven kinds of rays in the white light of the sun. Saptârchi not being its synonym cannot give the same meaning. *Aswa* denotes a ray while *archi* the whole spectrum, or the glow that produces the spectrum. It is this property of Agni (oxygen) that lends colour to the statement that “Agni is made up of all the *Devas*.”

Indeed, it is too difficult to conceive how any one can pretend that this description does not refer to oxygen and oxygen alone.

The expression Prithivi, occurring in the Vedic literature in lieu of Agni, also denotes oxygen. In the Nirukta it is



given as a-synonym of Agni. Our researches have shown that fifty *per cent*—by weight—of the earth's crust ( $\frac{1}{2}$  mile deep) is oxygen. And perhaps when some of the present elements have been analyzed, we might be able to understand that the earth consists mostly of oxygen. The ancients having, in all probability, effected this analysis considered Agni and Prithivi synonymous with each other. If we do not assume this, we will be unable to explain why they should be used to denote the same object. The following table shows that oxygen is the predominating element composing the earth's crust, thus making the equality Prithivi=Agni (oxygen) literally true.

Element	%	Element	%
O	49.78	Na	2.33
Si	26.08	K	2.28
Al	7.34	Mg	2.24
Fe	4.11	H	0.95
Ca	3.19	Ti	0.37 etc.

It may be urged that all this is a sheer tentative argument, not a positive proof that the *Rishis* knew oxygen and its uses. It is, therefore, proposed to consider here the first few verses of the *Rig Veda* which deal with Agni.

However, before we take up this subject of the utmost importance and controversy, it is necessary to prepare the reader to receive and countenance certain views, that appear to go against the supposed usual custom of non-interference with the text of the Vedas. Inasmuch as Vyâsa and other *Rishis* had been the means of the composition and compilation of the Vedas, there can be no fixed touch-me-not custom with them. Moreover it is nothing less than bigotry and superstition to persist in a custom which has served its purpose and has no necessity to remain any longer. But

it is perfectly right to hold that men of the calibre of the *Rishis* only, need and should interfere with them. But who may be these men if they are not those with an enlightened and scientific outlook? Those of us who, in their extra-enthusiastic appreciation of the merits and abilities of our *Rishis*, and in their haste to bring the modern sceptic to his knees and make him confess his inferiority to them, go to the extremity of refusing even a side view of the Vedas, declaring that they are of supernatural origin, must now reconcile themselves to the view that, though they are worthy of such injunction in times when it is feared that through our ignorance we may miserably misshapen them, yet they must be subjected to a revision some day or other such, for instance, as our own. Nay; the present is the very time when, according to the statements of our own *Rishis*, the turn of the tide, the change of the Yugas, is taking place.

But apart from this, there are cogent reasons to support our position that since in the Veda, owing to its having passed through sufficiently unenlightened hands, there have occurred some additions and subtractions, sometimes accidental and at other times inevitable, we cannot without a modification of the extant text, however slight the modification may be, arrive at its correct rendering which was in vogue among the *Rishis* themselves. This is what has been felt by almost all the commentators, both mediæval and modern, though many of them have restrained themselves from making use of this liberty, even in cases where it has been sanctioned by authoritative and unambiguous rules, chiefly from the fear that they would be going against this supposed custom. Max Müller, in his preface to the first edition of the "*Vedic Hymns*", has expressed himself thus: "Strange accidents have happened in the text of the Vedas, but they have gene-

rally happened when the sense of the hymns had ceased to be understood; and if anything helped to preserve the Veda from greater accidents, it was due, I believe, to the very fact that the metre continued to be understood, and that oral tradition, however much it might fail in other respects, had at all events to satisfy the ears of the hearers. I should have been much less surprised if all the irregularities in the metre had been smoothed down by the flux and reflux of oral tradition, a fact which is so apparent in the text of Homer, where the gaps occasioned by the loss of digamma, were made good by the insertion of unmeaning particles; but I find it difficult to imagine by what class of men, who must have lived between the original poets and the age of the Prâtisâkhyâs, the simple rhythm of the Vedic metres should have been disregarded, and the sense of rhythm which ancient people possess in a far higher degree than ourselves, been violated through crude and purposeless alterations. I shall give a few specimens only. What but a regard for real antiquity could have induced people in VIII, 2, 8, to preserve the defective foot of a Gâyatrî verse, *samâne adhi bhârman*? Any one acquainted with Samskrit would naturally read *samâne adhi bhârmani*. But who would have changed *bhârmani*, if that had been there originally, to *bhârman*? I believe we must scan *sāmānē ādhī bhārmān*, or *sāmānē ādhī bhārmān*, the pæon tertius being a perfectly legitimate foot at the end of a Gâyatrî verse. In X, 158, 1, we can understand how an accident happened. The original poet may have said: *sûryô nô divaspātu pātu vâtô antarikshât, agnirnah pārthi-vebhyah*. Here one of the two *pātu* was lost. But if in the same hymn we find in the second verse two feet of nine instead of eight syllables each, I should not venture to alter this except in pronunciation, because no reason can be

imagined why any one should have put these irregular lines in the place of regular ones."

These views, coming as they do from a high authority, demand our utmost serious consideration. If they, the hereditary commentators, if we may be permitted to call them so, have not been bold enough to effect a change in the reading of the extant text, it must be due to one or the other of the following reasons. Firstly, they must have been—and indeed they are—ignorant of the original meaning of the verse in question and its relation to the context in which it occurs. Secondly, though they were daring enough to introduce the contemplated different version, they were effectively prevented from doing so by the environments under which they lived, chiefly owing to their own inability to substantiate the change with experimental evidence. But these will no longer deter us from having recourse to a new procedure that would leave us in no uncertainty as to the original form of the word or verse under consideration; for, in the first place, we have been able to understand the *Rishis*, and consequently what they intended to be embodied in these hymns, and in the second place, the society in which we live emphasises an extended outlook, and does not, with any measure of harshness or obstinacy, check us in the act of giving vent to a more acceptable though seemingly revolutionary views.

The nine *Gâyatrî* verses that form the first *varga*, *Ist. Adh.*, *Ist. Ast.*, of the *Rig Veda*, have *Agni* for their "Deity". The *Gâyatrî* verse is held by the *Hindus* in the highest esteem. It is the *Veda* itself. Many are of the opinion that this injunction refers to a particular verse only; namely,

*Ôm tatsavitur varênyam bhargô dêvasya dhimahi yô nah prachôdayat.*—But according to the ancients, the *Gâyatrî* verse stands for all the verses written in that metre. The

meaning of the statement that the Gâyatrî is the Veda, is that in the Gâyatrî metre are embodied the most important facts of science. We therefore should expect that in this first hymn there will be methods for the preparation of Agni (oxygen), and its uses and properties. It is with this expectation that we undertake to interpret the verses of the *Rig Veda*.

The first sloka is as follows :—

AGNIMILE PUROHITAM YAJNASYA DEVAMRITVIJAM,  
HOTARAM RATNA DHATAMAM.

The *padavibhâga* of the verse is :—

Agnim, ile, purôhitam, yajñasya, devam, ritvijam, hôtar-  
am, ratna, dhâtamam.

This opening sloka of the *Rig Veda* has been translated by various scholars, who all agree in giving it more or less the meaning :—"I magnify Agni, the Purohita, the divine ministrant of the sacrifice, the Hotri priest, the greatest bestower of treasures," while its true meaning is somewhat different. *Yajña* means chemical action in which *Devas*, or the objects of physical sciences, are either produced or are made to interact. It is a chemical experiment in modern phraseology. We have the text:—"UDDISYA DEVATAM DRAVYATYAGO YAGO ABHIDHIYATE." This is quoted by Sâyana, the renowned Indian commentator, who finds it convenient to forget to explain it, apparently because he is not sure of its real significance. *Uddisya* is an indeclinable governing the noun *dêvatâm* in the accusative case. *Dravya* means "substance," and *tyâga* means "separating or parting from." *Dravyatyâga* therefore means "separating from a substance." The text means: "Having desired (to produce) a *Devata*, separating it from a substance is named *Yajña*." *Yajña* coming from the same root, *Yaj*, is identical with *Yâga*, and denotes what we now term a scientific, more

particularly, a chemical experiment.\*

Since this meaning of *Yajña* must be fully understood by the student, in order to clear his mind of the false view that has been thrust upon him and which takes *Yajña* to be a *sacrifice*, where animals including human beings are mercilessly murdered, we quote from the Upanishads and Bhagavad Gîta, a few passages which substantiate the meaning herein set forth. In the *Mundaka Upanishad* † we read thus: "Let a *Brâhmaṇa*, after he has examined all these *Lôkas* (chemical substances) which are collected through *Karma* (scientific experimentation) acquire freedom from all desires. Nothing that is eternal can be gained by what is not eternal. Let him, in order to understand this take *fuel* in his hand, and approach a Guru who is *learned and dwells entirely in Brahman*." The *Lôkas* here spoken of are the *Lôkas* of the *Dikpâlas* already referred to. They are collected through *Yajña Karma*. The word *Karma*, occurring in this passage, does not mean mere action, but it is the chemical action. Through this chemical action are the elements collected. The natural result of fully knowing the properties and reactions of the reagents is "freedom from all desires." If we take *Yajña Karma* not to mean scientific experimentation, but only ordinary human activity, then we will be putting into the mouth of the *Rishis* what they never said,

\* Pundit Guru Datta has a note on this word. He says: "The word *Yajña* which originally indicated any action requiring association of men or objects and productive of beneficial results, is always translated by European scholars as 'sacrifice.' The notion of a sacrifice is a purely Christian notion, and has no place in Vedic philosophy. It is foreign to the genuine religion of India. Hence all translations in which the word "sacrifice" occurs are to be rejected as fallacious."

† I, 2, 13.

namely, "freedom from all desires" is obtained by acting with desires. This would be a palpable travesty of fact. Further, if it were the intention of the author to refer to ordinary human activity by the term *Karma*, then surely there would have been no necessity to ask any body "to approach a Guru" with "*fuel* in hand." The "*fuel* in hand" gives us an idea of some activity other than the ordinary human activity. It is, in fact the activity of the chemist with his Bunsen flame in a chemical laboratory. It is only too evident that to a chemist, a source of heat is indispensable for carrying on his experiments.

"Let a man tell this science of Brahman to those only who have performed all *Karma*, who are versed in the Vedas and firmly established in (the lower) Brahman, that is, Dharma....." The meaning of this is, that scientific knowledge of the material universe should precede that of the unmanifested Brahman, the subjective universe, or as it is also called the "psychic force." Max Müller, failing to understand this meaning of *Yajña Karma*, finds himself perplexed to read in the *Vājasanēyi samhita Upanishad*, as in others of "the recognition of the necessity of works as a preparation for the reception of the highest knowledge."

The following verses of the *Bhagavad Gīta*\* further bear out the statement that *Yajña* is chemical experimentation :—

"Since all action other than that relating to *Yajña* (scientific experimentation) is a bondage to (those of) this world, therefore, Kauntēya, act only for the sake of (improving and furthering) this *Yajña Karma* (scientific research), having cut off all bondage." This directs us to be engaged in scientific research throughout our lives. It is only by this

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\* Verses 9—16, IIIrd Chapter.

process that we will be able to cut off the bonds of *samsāra*.

"Formerly, having evolved men together with *Yajñas* (the means of understanding Dharma or the Laws of Nature), *Prajāpati* told them thus: 'Prosper yourselves by this *Yajña*. Let it be sufficient unto you to fulfil all your desires.'"

"By *Yajña* may you obtain the *Devas* (the Agents of Nature, such as oxygen, hydrogen, electricity, etc.). May the *Devas* in their turn cause you to be. Being thus mutually produced ye shall obtain the best prosperity.' " It is clear that the *Devas* are produced from the *Yajñas*. These *Devas* go to build up our bodies. This cannot be true if the *Devas* are anything but chemico-physical reagents.

"The *Devas* obtained from *Yajña* will bestow desired enjoyments: and he is verily the thief who appropriates the results for his own self without offering them to the *Devas*.' " It is here meant that scientific investigation must not be undertaken for the sole purpose of economic excellence and personal gain, but for furthering the search after truth.

"Indeed those good men are free from all sins who live on what is left after completing *Yajña* (the true worship of the Almighty); but they who perform these *Yajñas* with a selfish motive of enjoying their fruits are eating the very sin."

"Beings are born from food, food is born from rain, rain from *Yajña*, and *Yajña* from Karma (chemical action)."

"Know thou (*Arjuna*) that that Karma takes place through (the lower Brahman, i.e.), Dharma, who himself has evolved from the Imperishable (*Ātman*)....."

If these statements have anything to teach, it is that *Yajña* is chemical reaction or experimentation.



Of such Yajña is Agni the *purôhita*. "*Sântika paushtika* adi karma su *purôdhîyata* iti *purôhita*." *Purôhita* therefore means: "He who is reckoned first in experiments relating to *sânti* and *pushti*, that is, oxidation."

The term *Deva* is the next in importance requiring a satisfactory explanation. It is often mistaken to denote a super-natural being; and like many other words used by the Rishis, it defies all attempts to fathom its real meaning unless we concede to it a scientific significance, which it all the more deserves being the favourite term of the Vedic scientists. While discoursing on *Mâyâ*, Vyâsa is reported to have declared that "All religious dogmas only serve to obscure the intelligence of man ..... Worship of *Devas*—in the spirit in which the modern superstitious Hindus are accustomed to carry on—*under the allegories of which is a hidden respect for Natural Law (Dharma)* drives away truth to the profit of the basest superstition." This exactly is our position now. We shall, therefore, begin by quoting some of the remarks made in the *Nirukta* that will explain the etymology and meaning of the word.

Yâska informs us (*Nir. VII. 1.*) that "when it is known which substance it is that forms the subject of exposition in the mantra, the term signifying that substance is called the *devata* of the mantra." That is, "*devata* is a general term applied to those substances whose attributes are explained in a mantra"—(*Pundit Guru Datta*). Yâska says again (*Nir. VII. 15.*):—*Devô dânadvâ dîpanâdvâ dyôtanâdvâ dyusthanô bhavati*, which means "that whatsoever or whosoever is capable of conferring some advantage upon us, capable of illuminating things, or capable of explaining them to us, and lastly, the Light of all lights, these are the fit objects to be called *devatas*"—(*Guru Datta*).

Further Yāska writes thus:—

“We shall now enquire who are the devatas in those hymns in which no devata is indicated. They are addressed to the devata to whom the Yajña or part of a Yajña (in which they are employed) belongs. The hymns which are unconnected with a Yajña are, according to the experimentalists (Yājñikās), addressed to Prajâpati; according to the etymologists (Nairuktâh), they are spoken in praise of men. Or in such cases the devata may be an optional one, or a class of devatas: for it is a very prevalent practice to (classify Yajñas) as those which have a devata, an athithi, or a pitri, respectively, for their devata. In reference to what has been said that hymns are either (1) relative to an experiment, or (2) addressed to a devata, (it is remarked that) objects other than devatas are lauded as devatas, as, e.g., the objects beginning with horses and ending with herbs (see Nighantu, 5, 3, and Nirukta, IX. 35 ff). But let him (the student) not regard any matters relating to the devatas as if they were accidental: this may be clearly seen. Owing to the greatness of the devata the one Soul is lauded in many ways. The different devatas are members of the one Soul. And (the learned) say that the Rishis addressed their hymns according to the numerous natures of the existences; and (further) from the universality of the definition of their nature (these existences) are produced from each other and possess the natures of each other; they are *produced from the Yajña Karma*; *they are produced from the Soul (the psychic force)*.....”

“There are three devatas according to the etymologists (Nairuktâh), viz., Agni, whose place is on earth, Vāyu or Indra, whose place is in the atmosphere, and Sūrya, whose place is in the sky. These (devatas) receive many designations in consequence of their greatness or from the

diversity of their functions, as (the appellations of) hôtri, adhvaryu, brahman, and udgâtri, are applied to one and the same person. Or the devatas in question may all be distinct, for the praises addressed to them, and also their appellations, are distinct. As (regards the view that) this (diversity of appellations) arises from difference of functions (and not from distinctness of personality, it may be objected that) a plurality of individuals also may each fulfil their separate allotted functions. In this latter case, a community of locality, and of possession, must be remarked. Thus, men, beasts, and devas, occupy the earth; here is community of place. Community of possession, too, is seen in such instances as that of the joint occupation of the earth both by Parjanya and Vâyu and Âditya, and of the rest of the world by (Vâyu, Âditya, and) Agni. Here the case is like that of a kingdom and its inhabitants, [*i.e.*, the one realm is occupied by different classes of persons (?)]'

'We have now to consider the forms of the devatas. One (mode of representation in the hymns) makes them resemble men; for they are praised and addressed as intelligent beings. They are also celebrated with members such as those of men. (An instance is given where Indra is so introduced). They are also (celebrated) with the accompaniments of possessions such as those of men; ..... and with functions of a similar character to the human.....'

" 'Another (mode of representation makes them) unlike men. But further, that which is seen (of them) is unlike what is human, as Fire, Air, Sun, Earth, Moon. As (regards the assertion) that 'they are praised as intelligent beings,'—it is also true that senseless things are in like manner praised, as the objects beginning with dice and ending with herbs

(Nigh. 5, 3; Nir. 3, 7 ff.). Again, as (regards the remark) that the devatas are 'celebrated with members such as those of men,' the same thing is done in the case of senseless objects, as stones are celebrated in the words, 'they cry with green mouths' (R. V. X, 94, 2.) Further, the same is the case as (regards the remark) that the devatas are (celebrated) 'with the accompaniments of possessions such as those of men' for a river is praised in the words, 'Sindhu has yoked his beautiful car drawn by steeds' (R. V. X, 75, 9.) And the same thing applies to the remark that the devatas are described with 'functions similar to those of men'; for stones are lauded in the words, 'even before the priests they eat food of melted butter' (R. V. X, 94, 2.) Or the devatas may be described under both forms (either as having, or as not having, a human form.) Or, again, when they are described as similar to men this may be merely *in their character of actors in a particular function, as Yajña (that is, experiment), is only the (temporary) act of the man who performs it.* This is the condition of all narrations.'\*\*

Indeed, the symbolism used by the Rishis has resulted from such a happy blend of its three kinds, the natural, poetic, and human, and is of such a systematized character that we, who are accustomed to conventions and vague notions, find it impossible to penetrate into its actual significance. The critical survey of the ideas connected with the *Devas*, will make it plain that they are neither mere things nor beings with human characteristics much less mere abstract ideas. But, yet, they possess properties which have the elasticity enough for their being metaphorically represented as either things or beings or even as ideas, and may, by the

help of art, be immortalized on solid rock or massive metal. The *Devas* have been personified inasmuch as they are the actors in *Yajñas* (experiments), just as men are the actors in this world. Similarities and divergences in the nature and results of actions resulting from the use of the one or the other *Deva*, to the corresponding nature and results of actions of human beings,—all governed by the conventional code of right and wrong, good and evil, just and unjust,—determine the special personified form of the *Deva*. Further, the etymological form of the names of some of the *Devas*, is often modified as may be gathered from the following statement of the *Rig Veda*; namely, “Inasmuch as he (Indra) kindled them (*Prânas*), he is called the kindler (*Indha*). They call *Indha* *Indra* imperceptibly: for the *Devas* love that which is imperceptible.” And why not if they want to avoid being misused?

The etymological meaning of the word *Deva* is “that which plays”, or that which acts and reacts (*Krîda*). It is also defined thus: “*Divyôpâpâdukâ dêvâ.*” Those who live in *swarga* are called *divyas*, and those who are not born from a mother’s womb, are known as *upâpâdukas*. *Devas* are, therefore, those that inhabit *swarga*, and are not born as either viviparous or oviparous creatures are born, nor even as those that spring from germs and plants. They “have no death,” “never grow old,” and “though subject to the three states, namely, production, existence, and dissolution or transformation, are in all these conditions as verile and active as youths aged twenty-five.” They “know much;” for what they are about we do not fully comprehend. This description is applicable only to the objects of physical sciences, and it must be so because they were realities seen and handled by the Vedic *Rishis*, who, to do them

justice, were not, as generally supposed, superstitious, nor polytheistic, henotheistic or any number of other "isms" of the inventive genius of the moderners, but, on the contrary, if the nature of these very *Devas* is properly evaluated, it would turn out that they were Scientists to their very core, possessing the Advaita religion, which is the inevitable stage of advanced scientific research.

And Agni is one of these *Devas*.

The verse therefore means :

*I praise (i.e., describe the properties of) Agni, the element that is reckoned above all the reagents taking part in oxidizing experiments, which performs the functions attributed to Hôtri and which is the greatest bestower of wealth.*

No doubt wealth here means the wealth of knowledge. Yet the ancients say that "gold is born from Agni."

The sixth verse of this hymn runs thus :—

YADANGA DASUSHENA TWAM AGNE BHADRAM KARISHYASI, TAWETAT SATYAMANGIRAH.

The *padavibhāga* of the verse is :—

Yat, aṅga, dāsushēna, twam, agnē, bhadram, karishyasi, tawa, it, tat, satyam, aṅgiraḥ.

In this verse, aṅga and dāsusha are the two words that have been hitherto misunderstood. Doubtless aṅga can be taken as a vocative particle, but it is unnecessary to do so since in the context we have agnē in the vocative case.

Dāsusha has been taken by Oldenberge and Sāyana to mean "to thy worshipper," and "for thy sacrificer," respectively, though there is no etymological warrant to deduce this meaning. Its root is *dāśri*,\* meaning "to hurt, to

\* Wilson says that this word in the sense "to hurt, to injure, or to kill," is restricted by some authorities to the Vedas.

injure, or to kill." From *dāsri* we have the noun *dāsa*, a fisherman. "*Matsyān dāsati dyāti dāsnōtiti vā dāsah.*" He is *dāsa* who "either gives or cuts or hurts *matsyas*." But what are *matsyas*? They are even "those which delight with the desire of feeding on flesh." Combining this word with *aṅga*, which means body, we have *aṅgadāsa* standing for that which either produces or destroys the micro-organisms that feed on the flesh and blood of our bodies. This physiological action is known to be one of the main functions of oxygen in our bodies. The word *aṅgadā-susha* is the modified or imperceptible form of *aṅgadāsa*, just as Indra is that of Indha. To be brief, we must, by the term *aṅgadāsusha*, understand oxygen in its capacity of the "fisherman" in our bodies. The figure of speech speaks for itself. Generally, however, the word *aṅga* is left out from the compound, and *dāsusha* alone is used to represent oxygen. Thus it occurs in verse 25; OM ASAH CHARSHANI DHRITO VISVEDEVASA AGATA DASVA AMSAH DASUSHANI SUTAM. When commenting on this verse the Aitarēya Āraṇyaka says:—"By *dāsusha* is meant *dadusha*," i.e., a giver. But giver of what? Sāyana says: "*Apādātau*," which means giver of water. Oxygen is of course, a component of water, and hence a giver of water. We, therefore, should take *aṅgadāsusha* to stand for oxygen which, acting as an oxidizing agent in our bodies, purifies the blood.

The verse therefore means :

*Agni (oxygen) ! that good which you bestow on us by your oxidizing effects in our bodies, is true of you only aṅgirah (i.e., is your Dharma.)*

Here *aṅgirah* is used to denote Agni. It may be recollected that it is the name of one of the seven Rishis of the Hindu mythology. So the seven Rishis are the seven

elements (exclusive of helium) of the first short period of the Periodic Table (?)

At first sight, it may appear strange that the vocative mode of expression be used in connection with a common noun, such as oxygen, denoting an inanimate substance, and that the second personal pronoun be put in apposition with it. But a little knowledge of the considerations that led the *Rishis* to adopt this process of representation would simply astonish us at the fund of common sense displayed by them. Is not the vocative mode of expression more impressive, and does it not imply "a strong and direct sense of perception with which omniscience alone is compatible?" Further, the use of personal pronouns in apposition with nouns of the stamp of oxygen, which signify parts of almighty Nature, only serves to direct our full attention towards the object and give it a lasting prominence and individuality that naturally belong to such class of objects. These objects exist not for a short period of time as is the case with the animate world. One may venture to say that since they are the elements out of which all that has been, all that is, and all that will be is built, their duration extends to eternity; whereas that of the frail animate beings is lamentably short. Why then should we not give the former a greater prominence than that attached to the latter, and express our ideas of them in the vocative case?

The *Niruktakāra* says (*Nir. VII, 1, 1 and 2*):—"There are three kinds of *Richas* (Vedic mantras), those pertaining to objects invisible or those beyond the range of perception; those pertaining to objects visible (that is coming under the direct cognizance of perception), and, lastly, those belonging to *subjective consciousness*. The first, that is those pertaining to objects invisible, are used under all names and in



all cases with the form of the third person of the verb. *Those pertaining to objects visible* are used in the second person only, and the word *tvaṃ* for their pronoun..... Those pertaining to subjective consciousness are always treated of in the first person and the pronoun *aḥam* standing for them.'

"This law prevails throughout in the Vedas. The mantras in which second person is used may be of two kinds. Where the objects are perceptible; there may come the form for expression, second person. Also, where the objects are invisible and the reciters visible, the same form of expression is used. The object of the above explanation is this. According to the ordinary rules of grammar, the first, second, and third persons are used in their respective places; the third person always in the case of objects void of consciousness, the first and second in the case of conscious objects only. This is only a general law of *laukika* and *Vedic* terms, but according to Vedic use even where the object is void of consciousness, but regarded as perceptible, the second person is used. The object of thus vivifying, as it were, the inanimate objects, is to render them directly amenable to the utility and perceptibility of man." (Guru Datta).

So, to strictly adhere to modern mode of expression, the verse means :—

*The good which oxygen bestows on us by its oxidizing effects in our bodies, is true of oxygen only; that is, no other element has this property.*

The second verse of this hymn deals with the immutability and universality of Natural Laws. It reads thus :—

AGNIH PURVEBHIH RISHIBHIRIDYO NUTANAIRUTA  
SADEVAM EHAVAKSHATI.

The *padavibhāga* of the verse is :

Agnih, pûrvêbhih, rishibhih, îdbyah, nûtanaih, uta, sah,  
dêvâm, â, iha, vakshati.

Translation :—

*Agni (oxygen) is praised by the ancient as well as modern Rishis. It accumulates (?) the reagents in this place (experimental hall.)*

The use of the present tense here, as in other Vedic passages, makes it plain that the virtues (properties) of the *Devata* praised (here Agni), are not dependent on the duration of time. This scrupulous adherence to the present imperfect tense throughout most part of the Vedas, is what distinguishes them from the ordinary literature, and ranks them with the scientific literature of the modern times. The properties of oxygen have been the same as we know them at present from time immemorial. This is the reason why its unchanging properties have been praised by the ancient as well as modern scientists.

As we find them recorded in this very first hymn of the Rig Veda, the methods by which the Rishis prepared oxygen are (1) analysis of water, (2) decomposition of potassium chlorate by heat. They could not but give only these two methods at this preliminary stage, because other methods are comparatively more difficult and necessarily unsuitable to help the revival of their sciences at a time, like the present one, when we have nothing to reveal the actual significance of their utterances.

The experiment with potassium chlorate is recorded in the eighth verse of this hymn. It reads thus :—

RAJANTAMADHVARANAM    GOPAMRITASYA    DIDIVIM  
VARDHAMANAM SWEDAME.

Sâyana gives the *padavibhāga* as follows :—

Rājantam, adhvarānām, gōpām, ritasya, dīdivim, vardhamānam, swēdamē, and the translation as follows :—

“(We approach Agni) who shines, who protects Yajña from the mischief of the Rākshasas, who reminds us over and again of true or fixed karma, and who increases in his own house.”

Hermann Oldenberge, in his “Vedic Hymns,” Part II, takes the *padavibhāga* to be :—

Rājan, tam, adhvarānām, etc.  
and gives us his translation as follows :

“Who art the king of all worship, the guardian of Rita, the shining one, increasing in thy own house.”

These two interpretations are misleading. If we follow Sāyana we are confronted with a number of difficulties :

1. The form rājantam is incorrect if it is taken to mean he “shines.” There is only one conjugation of the root rāj which has any semblance to it. It is rājantām, the third personal plural in the imperative mood, meaning “may they shine.”

2. Ritasya does not mean “of true or fixed karma,” but may mean merely of truth.

3. Didivim never means “one who reminds over and again”, but, when it is a noun, as in the present case, it always means “boiled rice.” It is also defined thus : *Dīvyantī anēna didivi*,—“by this they shine.”

4. The meaning given to adhvara is not in conformity with the explanation we have given to Yajña with which it is synonymous.

If on the other hand we follow Oldenberge, we have to accept without question the following defects :

1. Rājantam is taken to be a compound of rājan and tam, and translated by “who art the king”, which is in direct

contradiction with the statement made in the first verse.

2. Rita is not explained, and if taken to mean sacrificial dais, the idea is altogether foreign to the Vedic scientists.

3. Dīdivim does not mean "the shining one."

4. What applies to Sâyana's gloss on the word adhvara, applies equally to our learned author's explanation.

Besides, both the commentators have failed to apply metrical tests, in order to remedy any deviations that might have taken place in the body of the verse.

The verse being a Gâyatrî must contain 24 syllables. The sixth and the seventh syllables of each of its three feet shall as far as possible be either a trochee or an iambus. Instead, we have here only 22 syllables in all, and the three feet respectively have a spondee, an iambus, and an iambus, for the sixth and seventh syllables. If now we change the words rājantam and swēdamē into rājanitam and swēdamēva we will have 24 syllables in all, and the sixth and seventh syllables of the three feet will then be an iambus, a trochee and an iambus, respectively. This then we may tentatively take to be the original form.

Now it devolves on us to justify the amended reading, viz.,  
RAJANITAMADHVARANAM GOPAMRITASYA DIDIVIM VARDHAMANAM SWEDAMEVA.

We must satisfactorily explain (1) that the anomaly found in the extant reading of the text, could not have existed in the original reading, and (2) that under such and such conditions the deviation was a possibility and a matter of necessity. In connection with the first requisite, it is sufficient to state that the foregoing two renderings are completely devoid of any involved scientific principle or fact and consequently are inadequate. This inadequacy of the trans-

lations is mainly due to a misunderstanding of the term *râjanitam*, which, when analyzed with a view to draw out the involved scientific idea, will present to us the two words *râ* and *janitam* meaning Agni, *i.e.*, oxygen, is born or produced. As to the second requisite we need hardly say that the deviation is easily explicable. *Râjanitam* may with the utmost ease become *râjantam*, when its true sense is forgotten but not the sense that it has some meaning, probably, super-natural. The similarity of sound of the two forms is so striking that no jarring effect will be noticed by either the Guru or Sishya engaged in its repetition.

But, above all, the support that the proposed change gathers for itself, is based on the main ground that it enables us to construe the various words of the verse, without in the least having recourse to any twisted and illogical meanings. It enables us to derive a principle scientific fact from the natural and ordinary meaning of the words of the *śloka*. And by this process alone we will be much nearer the truth that the Vedas contain *Truths*.

The true *padavibhāga* is :—

*Râ*, *janitam*, *adhvarânām*, *gôpâ*, *mrityasya*, *dîdivim*, *vardhamānam*, *swêdamêva* (*swê*, *damê*, *êva* or *swêdam*, *êva*.)

*Râ* is the plural of *rah* which is a name of Agni (oxygen.) *Gôpâ* or *Gôpî* is an Indian plant (*Echites frutescens*), which is used in the preparation of *Sarsaparilla*. The name *Gôpâ* is given to the plant because "It cherishes *gô*." *Gô* is synonymous with *Prithivi*, and *Prithivi* in the Vedic chemical terminology means oxygen, more correctly ozone. *Gôpâ* therefore cherishes or builds up a substance whose molecule possesses, besides other elements, three atoms of oxygen. We know that plants on land contain potassium salts, and since the substance built up by the *Gôpâ*

plant is a potassium salt containing three atoms of oxygen, it can be nothing other than *potassium chlorate*.

Mritam is a term applied in the Hindu medical literature to anything that is left after being burnt, calcined, or reduced (metals.) Here it is used in connection with the plant Gôpâ, so that gôpânritasya means "*of the ashes of the Gôpâ plant.*" There is no requirement whether of logic or consistency that prevents us from taking didivini to denote the filtrate that is obtained after digesting these ashes with water, since this procedure involves the main idea connected with the word. Swêdamê has been explained by "in thy own house." But there is yet another view of it. Swêdam is heat. Swêdamêva may also be taken to mean by heat or on heating. This meaning is quite independent of the other. The fact that the word *dama* is confined to the Vedas only, has an important lesson to teach. The compound swêdamêva is evidently intended to give us two meanings: (1) on heating, (2) in thy own house.

Translation :

*Oxygen is produced in experiments in which (the substance got by evaporating) the filtrate from the digested mixture of water and the ashes of the Gôpâ plant is heated. It develops in its own house.*

Note the use of the plural termination of the word adhvarânâm. It is used to denote the series of experiments—the burning of the plant to ashes, the digestion of the ashes, the evaporation of the filtrate, and lastly the heating of the solid substance.

The modern version of this experiment is that by heating potassium chlorate we get a supply of oxygen gas.

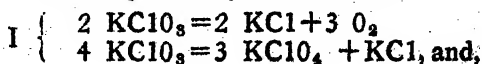
Generally plants on land contain potassium salts, and there was in vogue in America, down to very recent times, a

method of preparing potassium carbonate from the ashes of plants. It is, however, very rare that a plant contained the chlorate of potassium. Now, what transpired on an actual experiment being made with the Gôpâ plant was that it confirmed what has been hitherto advocated in this book, thereby securing an unequivocal triumph of this scientific method of Vedic interpretation.

The Gôpâ plant, which is generally found in rocky soil, was brought, washed well, dried in the sun, and burnt to ashes. The ashes were digested with hot water and filtered. The filtrate was strongly alkaline, showing, of course, the presence of potassium carbonate. The solution was left over in the sun to crystallize slowly. Well defined crystals of the monoclinic system were obtained. The solid was then chemically examined. It contained the carbonate, chloride, and other salts of potassium ; and it also contained potassium chlorate !

In ancient days every Yajñasâla or laboratory contained a large pit, in which huge quantities of plants and wood were burnt for the acquisition of potassium salts. It was termed *agnîdhra*.

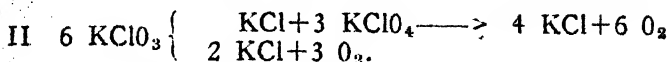
The significance of the double meaning that the term *swêdamêva* is capable of furnishing, cannot be underrated. Setting aside the idea of heat that it gives at first sight, let us consider what is meant by the phrase "increasing in thy own house." We know now, after independent research, that oxygen is got from  $KClO_3$ , not all at once, but in two stages. First, the chlorate melts and gives off a part of its oxygen and then solidifies. On further heating the solid melts and gives off the rest of the oxygen contained in the substance. The changes are symbolized thus :





The whole reaction is written thus :

bet. 340°–610°                      above 610°



This, then, that oxygen is obtained in two stages is what is embodied in the phrase “increasing in thy own house.”

The ninth verse gives further information about  $\text{KClO}_3$ . Its correct version runs thus :—

SANAH PITEVASUNAVE AGNE SUPAYANE BHAVA SACH-  
ASWANATI SWASTHAYA.\*

Sâyana gives its *padavibhāga* thus :

Sah, nah, pita, iva, sūnavê, agnê, su, upâyanah, bhava,  
sachaswâ, nah, swastayê,  
and the translation thus :

“O Agni! become happy-making to us, just as a father is to his son, and be ready to avert our destruction.”

Oldenberge translates this verse as follows :

“Thus, O Agni, be easy of access to us, as a father is to his son. Stay with us for our happiness.”

Sâyana translates sūpâyana by “happy-making,” and Oldenberge by “easy of access.” In reality it is a compound of two words sūpa and ayana, which respectively mean “condiment or soup,” and “house or dwelling.” Sūpâyana, therefore, refers to the solution (dīdivim) of the last ślōka, which is extracted from the ashes of the Gôpā plant, and which contains  $\text{KClO}_3$ .

Sachaswâ is taken by Sâyana to mean “be ready,” and

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\* The extant reading is : “Sanahpitêvasûnavê agnê sūpâyano  
bhava sachaswânah swastayê.”



by Oldenberge to mean "stay." It is a compound of three words,—*śah*, *cha*, *swa(nati)*. *Swasti* is indeclinable and cannot take the form which it has in the extant version of the verse.

The real *padavibhāga* is:

*Sah*, *nah*, *pita*, *i*, *vasu*, *ūnave*, *agnēh*, *sūpa*, *ayanē*, *bhava*, *śah*, *cha*, *swanati*, *swasthayā*.

In his "Sanskrit and English Dictionary," Wilson says that *vasu* is the name of "a kind of salt." *Vasukam* is "a fossil salt brought from a district in Ajmere." It should be noted in this connection that  $\text{NaClO}_4$  and  $\text{NaClO}_3$  occur together with  $\text{NaNO}_3$  in native Chili saltpetre. Probably the fossil salt which *vasukam* signifies contains a chlorate. *Vasu* is synonymous with "*audbhidam*," which is also "a kind of salt." The latter is derived from *udbhid* to which "*an*" is affixed. *Udbhid* is derived from *ud* meaning up, and *bhid* to break or burst. Does this signify that the salt bursts or explodes? Amara derives the word *vasuka* thus: *Vasat yasmin tēja iti vasūka*. The word *tējah*, which is one of the *pañcha bhūtas*, is a name of Agni or oxygen, and this text of Amara says that oxygen resides in this salt, i.e., oxygen is one of its constituents. Clearly the salt is a chlorate, and since it is different from the ordinary salt, it is sure to contain potassium. The term *vasu* therefore stands here for  $\text{KClO}_3$ .

Translation:

*The potassium chlorate (vasu) which is the source of (literally, parent of) oxygen, is obtained on evaporating the extract (from the Gôpā ashes); and it is explosive on account of its constitution.*

I have translated *ūnavē* by "on evaporating," because the root *ūna* means "to deduct or lessen." *Swanati* is, of

course to make sound. It is here translated by to explode. Swastha is a compound of swa and stha. Swa means one's own and stha "what or who is or stays,"—its being or nature (constitution). Swastha, therefore, has been translated by "its constitution."

The other experiment is recorded in the third verse whose current version is :

AGNINA RAYIMASNAVAT POSHAMEVA DIVEDIVE YASASAM VIRAVATTAMAM.

According to Sâyana, its *padavibhāga* is as follows: Agninā, rayim, asnavat, pōsham, ēva, divēdivē, yasasam, viravattamam; and its translation is :

"By (worshipping) Agni, the yajamāna (*i.e.*, the sacrificer) obtains wealth which multiplies day by day, which is accompanied by fame and glory, the results of charity, and which is abundant in heroic offspring and friends."

In the first place, we cannot recognize this translation as an authority since it does not contain, at least in potential form, any trace of scientific fact or principle, but, on the other hand, is a mere common place talk which, we are convinced, is not the nature of the subject matter of the Vedas. Secondly, we have here the word rayim translated by "wealth" solely on the authority of the Nirukta. We are not sure what value should be attached to the contents of the Nirukta. Its perusal makes it clear that its author either did not fully know the esoteric meaning of various terms used in the Vedas, or has deliberately tried to veil the esoteric meaning. It appears that his explanation does not conform to, or, at any rate, does not fully realize the significance of the requisitions set forth by Jaimini at length. He is ambiguous and not decisive. What applies to the Prātisākhya, it is given elsewhere, applies equally to the Nirukta. Lest we

should be misunderstood, we definitely state that the evidence in respect of this work firmly supports the view that it is handed over to us in a more or less corrupted form. It would be foreign to the purpose of this volume to deal with this branch of the subject, and therefore, we content ourselves by affirming that though the meanings given in the Nirukta may have application in the Vedas, yet we feel justified in insisting on their invalidity if they do not act in harmony with logic and common sense, and aid us in focusing our intellect and imagination over the involved scientific fact or principle. Thirdly, the word *divah* no doubt means a day, but this meaning has no appropriate place in the context of the *ślōka*. *Asnavat* is here taken for a verb meaning to obtain. The root *asa* is never known to take the form *asnavat*. Further it means "to pervade, or to heap," if it takes the form *asrute*, and "to eat," if *asnāti*.

Oldenberge, too, has been similarly misled. His translation is :

"May one obtain through Agni wealth and welfare, day by day, which may bring glory and high bliss of valiant offspring."

It is advisable and necessary to refer here to an injunction of Jaimini with respect to the *vibhaktis*, that is, the cases of words used in the Vedas. "*Ūha*," says Jaimini, is an essential factor in properly interpreting the Vedas. "By *ūha* is meant an alteration wrought upon a text to enable it to convey a modified but kindred meaning," is the commentary of *Sāyana* on the word *ūha*. This gives the student, who has been initiated into the mysteries of the Vedas, a certain scope to modify or assume the cases of certain words occurring in the extant readings of the Vedas, with a view to derive a meaning different from the ordinary one. If, now, we add to

this the statement "you who in your pride, would read the sacred Scriptures without the Guru's assistance, do you *know by what letter of a word* you ought to begin to read them,.....do you know *when the final letter becomes an initial and the initial becomes final*," who would charge us with impropriety and venturesomeness if we propose to change the verse that is before us into

AGNINARAMASANIVAT POSHAMEVA DIVEDIVE YASASAM  
VIRAVATTAMAM,

knowing that in this latter form it contains an important scientific truth ?

If this was the original form, how could the deviation be explained ? To start with, we unhesitatingly record that the extant version of the verse could not have been its original form, inasmuch as in its present version it does not embody any scientific fact or conclusion. In the second place, it is very easy, when the scientific significance of the slôka is lost, to so mix up the two words agni and nâram that they would give agninâ and ram. Agninâ is, of course, quite intelligible. But how to interpret ram. When this difficulty was thrust to the forefront, it is more than probable that the person who was at work, seeing that a word rayim existed in the Nirukta and other Vedic passages, and finding that its use here would give a somewhat probable meaning to the verse, should have changed ram into rayim, and to compensate for the resulting metrical anomaly, should have effected a further change, namely, asanivat into asnavat, perhaps, taking shelter under a rule in the Prâtisâkhya, which allows for a coalescence of two short syllables into one, when a verse contains more than the required number of syllables. This change did no doubt give him courage and justification for the sixth and seventh syllables of the first of the three feet

would then be a trochee, which, according to the Prâtisâkhyas, should characterize a Gâyatrî verse.

But we give below what an authority, Max Müller says about this metrical requisition. "Now," he observes, "it has generally been supposed that the Prâtisâkhyas teaches that there must be a long syllable in the eighth or tenth place of Traishṭubha and Jagata and in the sixth place of Anuṣṭubha Padās (Gâyatrî is included in the Anuṣṭubha metre.) ..... If we carefully follow the thread which runs through these books, we shall soon perceive that even with the proviso that a short syllable follows, the Prâtisâkhyas never teaches that certain final vowels must be lengthened. The object of the Prâtisâkhyas, as I pointed out on a former occasion, is to register all the facts which possess a phonetic interest. In doing this, all kinds of plans are adopted in order to bring as large a number of cases as possible under general categories. These categories are purely technical and external, and they never assume, with the authors of the Prâtisâkhyas, the character of general rules." Further on he adds that "A general rule, therefore, in our sense of the word, that the eighth syllable in hendecasyllabics and dodecasyllabics, the tenth syllable in hendecasyllabics and dodecasyllabics and the sixth syllable in octosyllabics should be lengthened rests in no sense on the authority of ancient grammarians." Max Müller, therefore, sums up: "If, therefore, we say that, happen what may, these metrical rules must be observed, and the text of the Veda altered in order to satisfy the requirements of these rules, we ought to know at all events that we do this on our own responsibility, and that we cannot shield ourselves behind the authority of Saunaka or Kātyāyana." To this we need only add that if we want to give effect to these supposed rules of the Prâtisâkhyas, let us

do so not merely "on our own responsibility," but only when we satisfy ourselves that by their observance we will not in any way infringe the rules of grammar, and miss the thread of scientific principles, running through the length and breadth of the whole Veda.

We therefore take the correct form of the verse to be :—

AGNINARAMASANIVAT POSHAMEVA DIVEDIVE YASASAM  
VIRAVATTAMAM.

*Padavibhāga* :—

Agnih, nāram, asanivat, pôsham, êva, divê, divê, yasasam, vîravattamam.

It has been explained that the phenomenon of lightning (electric discharge) was understood by the *Rishis* in its capacity of producing water. Asani is a term applied to this lightning. The termination vat, resulting from the combination with matup, means either resembling or possessing, so that, asanivat stands for something that closely resembles lightning, or, following the analogy of "pitriyat," "himavat," etc., it may mean "possessing (unmanifest) lightning," that is, possessing electric energy. It is, in fact, the electric current. Agni is the chemical term for oxygen. Nāram is water. Yasasam and vîravattamam qualify nāram, which is in the objective case. The word pôsha is derived from the root push, meaning (1) "to nurture," (2) "to divide," (3) "to wear (break)." We take here the meaning "dividing" or better decomposing for pôsham.

Dive is the dual form of the nominative case of diva/h which means heaven. Dive means two heavens. Since the synonym of the word diva/h occurs in statements such as "the first substance is Prithivi, the second is Dyau," it should be taken in Vedic passages to mean heaven, not day.

We have now to consider the equality

Divah=Âditya=Hydrogen.

What does Âditya, the sun, signify? This is the first question that should be answered; and we can do nothing better than quote from modern astronomical researches to show that it stands for hydrogen according to the nomenclature of the Vedic chemists who, it should be added to their credit, had the prudence to invent a system of representation that was broadly written on the face of Nature, thus securing an eternal life to their statements. The "laukika" meaning of Âditya is, of course, the sun. But in its esoteric significance, as the following paragraphs will show, it stands for hydrogen.

"The nature of the sun's spectrum indicates that there is a central body from which we get a continuous spectrum, and that surrounding this there is an absorbing atmosphere giving rise to dark lines. By observations made during the total eclipses of the sun, and in other ways, we become aware that outside the reversing layer there is an atmosphere of incandescent *hydrogen* called the chromosphere, and beyond this again a much more extended halo known as the corona the central portion of the sun which gives rise to the continuous spectrum sometimes called the photosphere—need not necessarily be a solid, for a sufficiently thick layer of gas under pressure would produce a continuous spectrum like a solid or liquid does. The heated gases must be in a state of violent motion, convection currents carrying the substances up into the cooler portions of the atmosphere there to condense and fall back again into hotter regions where they are again vapourised."

Another author says that "The sun's chromosphere shows what appears to be stupendous flames of incandescent

\* "An Introduction to the study of Spectrum analysis," p. 95.

*hydrogen*, in some cases towering over 300,000 miles (M. Fenyi, 1892) into space, and 100,000 miles in width (C. A. Young, 1872) thousands of times larger than the earth on which we live. "\*"

It is evident then that we know the sun to be something surrounded by a mighty "Lôka" of hydrogen. The term *Âditya* is applied to this hydrogen, since the latter is the predominating substance in the sun. *Âditya* represents hydrogen in much the same way as *Prithivi* represents oxygen. In the second hymn of the *Rig Veda* this hydrogen is distinctly termed "*vâyava darsata*" which means "the gaseous sun."

Spectroscopic observations have also shown that hydrogen is present in *nebulæ* and certain stars. *Nebulæ* is a name applied to certain bodies in the heavens from their cloud-like appearance, which gives them a resemblance to faint comets or specks of luminous fogs. Many *nebulæ* are resolved into clusters of stars. There is also a class of them which cannot be resolved into star-clusters, being shown by the spectroscope to consist of incandescent gas, which has been declared to be in the main hydrogen. "According to the nebular hypothesis of Laplace," says a writer, "the stars have been formed by the condensation of the original widely diffused nebular matter. The spectra of well-defined *nebulæ* exhibit bright lines, as if the radiating bodies were altogether gaseous, the *hydrogen lines* being predominant."

It is this region of the heavens occupied by these *nebulæ* that is generally termed "the heaven (*Divah*)."<sup>\*</sup> Astronomers have admitted that in these regions hydrogen is found in abundance. From these and surely other astronomical con-

\* "Modern Inorganic Chemistry." Mellor.



siderations, the *Rishis* deduced that the farthest distances in the heavens are filled with gaseous matter of which hydrogen is the predominant substance. Hence *divah* (heaven) stands for hydrogen in the Vedic terminology. This is the esoteric meaning that should be given to the word *divah*.

In order to support this interpretation of the words *Âditya* and *Divah* and to establish that the *Rishis* were aware of the astronomical methods employed by the modern scientists, we adduce here the authority of the *Aitarêya Brâhmaṇa* and *Aitarêya Âraṇyaka*. Dr. Haug, who has translated the former work, records a statement made in the *Brâhmaṇa* thus :—" 'The sun never sets nor rises. When people think that the sun is setting, it is not so ; they are mistaken. For after having arrived at the end of the day, it produces two opposite effects, making night to what is below and day to what is on the other side. When they (the people) believe it rises in the morning, the sun only does thus : having reached the end of the night, it makes itself produce two opposite effects, making day to what is below, and night to what is on the other side. In fact the sun never sets ; nor does it set for him who has such knowledge.....' " And he remarks that this passage contains "the denial of the existence of sunrise and sunset," and that "its author supposes the sun to remain always in its high position." This would be sufficient to surely remove any doubts cherished by wilful sceptics, regarding the prevalence of the astronomical science in the Vedic period. Nay ; Mr. B. G. Tilak in his "*Qrion*" has based, like many other investigators, all his arguments to arrive at the date of the composition of the Vedas, or in his own words "the antiquity of the Vedas," on the astronomical data found in the Vedas. When the Vedic *Rishis* could produce a calendar which in no essential point falls short of

the one used by the modern astronomers, there is no reason why we should not infer that the former were as proficient in astronomy as the present-day scientists are. Further, the fact that helium was detected in the sun by the ancient *Rishis*, must needs imply spectroscope observations. There can be no doubt that *Mārttānda* stands for helium.\* *Mārttānda*, though meaning the sun, does not here stand for hydrogen inasmuch as it is that which "regenerates the dead worlds," a property attributed to the alpha-rays, not to hydrogen (*R. V. I, I, 5, 4-6*). It is, therefore, evident that astronomy was fully developed by the ancient *Rishis* of India, and consequently, there is nothing preventing us from inferring that they applied the methods of that science to detect the enormous quantity of hydrogen in the chromosphere of the sun and in certain stars and nebulae.

*Divah* is also spoken of as *Tridivah* because "it is the third world," or because "here *Vishnu*, *Hara*, and *Brahma*," the trinity of the Hindu mythology, "are playing." *Vishnu* represents ozone. In the *Aitarêya Brâhmaṇa* we read thus *agnirvai sarvâdêvatâ Vishnurvai sarvâdêvatâ*, and in the *Taitariya Samhita*, *tê dêvâ agnau tanuh samnyadadhâte tasmât âhuragnih sarvâdêvatâ*, which respectively mean "Agni is all the *Devatas*, *Vishnu* is all the *Devatas*," and "The body of Agni is composed of the atoms of these *Devatas*." Agni and *Vishnu* are each all the *Devas*. Therefore Agni is the same as *Vishnu*, and yet they are different. What then could *Vishnu* be if not ozone which is but oxygen (Agni). *Hara* and *Brahma* probably stand for nitrogen and hydrogen respectively. The place where only these play is termed *Tridivah*. This is known now to be the nebular spheres in the farthest heavens.

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\* Vide Chapter II.

That the expression "Lôka" when applied to a chemical substance denotes the sphere in which the substance is found, is the next point requiring proof. In the 7th Khânda, 1st Âdhyâya, IIInd Âranyaka, of the Aitarêya Âranyaka, we read :

1. "Next follows the different elements of that Purusha (the supreme principle of Nature).

2. "By his Vâk are Prithivi and Agni generated. In Prithivi ôshadhi (herbs) are born, and Agni makes them ripe and sweet. 'Take this, take this,' thus saying do Prithivi and Agni serve their parent Vâk."

Here Vâk stands for electricity because it is the one natural energy that produces sound spontaneously, and because it is with the aid of this that most of the Natural Laws are made known to man. It is as it were the speech of Nature : and since the Rishis knew that a large number of chemical and physical experiments could be worked to a successful end only through the use of electricity, they did not hesitate to call it, of course, from a higher point of view, the speech of Brahman. There are statements in the Vedas that bear us out in this interpretation, viz., that Vâk is the electric current. In verse 7, R. V. X, 81, Visvakarman is spoken of as Vâchaspati. Visvakarman is the electric current so that Vâk, too, is the electric current. That Visvakarman is the electric current is evident from the first verse, R. V. X, 82, or V. S. 17, 25, where it is directly referred to as "generating moisture when oxygen (Prithivi) and hydrogen (Divi) were together." Satapatha Brâhmaṇa says (VII. 5, 2, 21): "Vâk is the mover, i. e., that which flows like a current. It was from Vâk that the creator of all things produced creatures." The same work (VI. 1, 1, 9) has "Sah apah srijata vâchâ... .." which means "he generated water by Vâk....."

There are other verses dealing with this identification of Vāk with the electric current which will be given in the sequel. By this Vāk Prithivi and Agni, ozone and oxygen, are produced. We had taken Prithivi to represent oxygen in connection with the first equation given at the beginning of this chapter. This we did because we did not want to jump into complexity all at once. But in reality Prithivi stands for ozone. In the enumeration of the *pancha bhūtas*, there occur two names, Agni and Prithivi, representing two different substances. The property of the one is *tējas* while that of the other is smell. We know also that the two terms are used as synonyms. What then could Prithivi be if not ozone which, unlike oxygen, has a strong unpleasant smell? Further, Vishnu is often praised in terms such as "you are Prithivi," and "you are Agni." We therefore take Agni=oxygen, and Prithivi=Vishnu=ozone.

The remark that "By his Vāk are Prithivi and Agni generated," therefore, means that electricity produces ozone and oxygen. In the *Mundaka Upanishad* we read that "from him (the Purusha) comes Agni, Sūrya being the fuel; ..... ." If this Purusha denotes electricity, the statement means that oxygen is obtained from Sūrya (hydrogen?) by some means in which electricity is used. We know that ozone is produced from oxygen by passing an electric discharge through it. Ozone has also been detected in the oxygen gas obtained during the electrolysis of acidulated water. These experiments show that through the action of electricity, oxygen has been transformed into ozone. Vāk is therefore spoken of as the parent of Prithivi and Agni. The next sentence treats of a biological principle yet to be proved. According to it, it is ozone that brings about germination in the seed, the necessary quantity of ozone being generated by

the action of radioactive radiations, issuing forth from beneath the earth's crust, on the oxygen of the moisture, and it is oxygen that ripens and sweetens the *ôshadi*. Agni does not mean fire inasmuch as the application of fire would tend to the destruction of the *ôshadi*, not to their sweetening. Ozone is often called in the Upanishads "anna" (literally food), since it is the cause of *ôshadhi* on which we subsist.

3. "As far as Prithivi reaches, as far as Agni reaches, so far does his Lôka extend, and as long as the Lôka of Prithivi and Agni does not decay, so long does his Lôka not decay, who knows this power of Vâk."

It is plain from this that the sphere in which a substance is found in this manifestation, is termed its "Lôka". It is in accordance with this system of representation that Divah is taken to represent hydrogen.

In the foregoing pages an attempt has been made to show that the ancients knew the nature of the sun, had a notation which is unconventional and exact, and that therefore Âditya = Divah = hydrogen. The terms dive dive, therefore, mean two hydrogen (atoms), two hydrogen (atoms). Hence the meaning of the slôka in question is:

*One (volume) of oxygen and two (volumes) of hydrogen are, indeed, the decomposition products of the all-pervading and hero-holding water by electricity.*

In order to further justify this interpretation of the verse, we cite here a different version of the same experiment from a different source. The third slôka at the beginning of the Krishna Yajurvêdîya Taitariya Âranyakam reads thus :

APAMAPAMAPAH SARVAH, ASMA DASMADITO'MUTAH.

AGNIRVAYUCHA SURYACHA, SAHA SAMCHASKARAR-DHIYA.

Its translation is as follows :

“ We obtain the all-pervading water,

From this, from this, and from this (is it) obtained,—

Agni ( $O_2$ ) and Vāyu ( $H_2$ ) and Sūrya ( $H_2$ ),—

Which will combine together chemically through electricity.

I use the words “ will combine chemically ” for *samchaskarah*, which is the frequentative form of *samskarak*. Wilson gives the latter the meaning : “ Preparing as an article of medicine or food,....., compounding, etc.” There is also the text : “ Stuta sastrayōstu samskāro yājñāvat dēvatābhīdhānatvāt.” The sense of the above passage is that that which is in praise of the *Devatas* (i.e., descriptive of their properties) is called *sastram*, while the act of combining (or compounding) of those which bear the appellations of *Devatas* is *samskāra*.

We give below the interpretation of this verse by Sāyana. He translates the first foot thus : “ I have obtained again and again the waters of all lands in order to secure *punya* over and again.” The second foot has been rendered thus : “ By the words ‘ *asmādaśmāt* ’ it is here intended to recount successively the different places where water was obtained such, for instance, as the Ganges, Saraswati, Yamuna, Gôdāvari and Cāvēry.” Here Sāyana is responsible for two palpable digressions. In the first place, he has failed to recognize the injunction contained in a *kalpa sūtra*, which he himself quotes in the text just preceding the present verse, and which definitely says that “ the water spoken of in this and the succeeding four verses is hot water (vapour).” The rivers enumerated by Sāyana give us only cold water. Secondly, he should not have expected any writer to refer to the distant rivers in terms “ this and this and

this" as if they were something portable and were placed before him, when he was writing about them. According to Sâyana's construction, the word *asmât* stands for the river, not for the water from the rivers. He proceeds: "By the word 'Ito'mutah' both heaven and earth are intended. From these two places are the waters obtained." We confess we are at a loss to understand how any one could logically derive this meaning from the text. No doubt the term *itah* itas mean "here, here!, or come here," but *amutah* never means heaven. It really conveys the idea "from this, or hence."

The third foot is rendered as follows: "Agni, Vâyû, and Sûrya help us in acquiring these waters." Of course, by these terms he means some super-natural beings. He ends his annotation of this verse by adding the translation of the last foot thus: "I purify the waters for becoming prosperous through these gods."

It is thus clear that Sâyana had been always erring because he had not the scientific outlook which we fortunately possess now.

The real *padavibhâga* and prose order of the verse are :  
*Âpâmah* (Ind. mood. I per. plu. root *âp*), *âpam*, *paḥ*,  
*sarvâḥ*. *Itah* (i.e., obtained), *asmât*, *asmât*, and *amutah*,  
 (viz.), Agni, Vâyû, and Sûrya (respectively). *Saha*, *samchas-*  
*karah*, *dhiyâ*.

We have taken *dhiya* to mean "through electricity" on the authority of the *Rig Veda*, which will be referred to when the terms *dhiyâm ghritâchî* and *dhiyâvasu* denoting electricity, are considered in the succeeding pages.

With a view to answer those who urge that all this may be a mere accidental coincidence, inasmuch as there is no direct evidence to prove that the Rishis knew the nature and

use of electricity, we here supply facts from the *Rig Veda*, which conclusively establish that the *Rishis* had recourse to electricity, and knew more about the radiations from radioactive matter than we do in this twentieth century.

In a foregoing chapter we had explained the identity of *Indra* and electricity. We now proceed to enquire whether this explanation would apply to the *Indra* who figures so prominently in the *Vedas*. The first hymn addressed to *Indra* occurs in the seventh *varga*, 1st *Mandala*, 1st *Âdhyâya* of the *Rig Veda*, and a consideration of its first few verses will be sufficient to answer our purpose.

The present reading of the first verse of the first hymn to *Indra* is as follows :

SURUPAKRITNUM UTAYE SUDUDHAMIVA GODUHE JUHUMASI  
DYAVIDYAVI

*Sâyana's padavibhâga* of this verse is :—

*Surûpa*, *kritnum*, *ûtayê*, *sududhâm*, *iva*, *gôduhê*, *juhûmasi*, *dyâvidyâvi*, and the translation according to the same authority is :—

“Every day we request *Indra*, the director of good action, to come (to us), as in the case of a milch cow for milking it.”

The phrase *surûpakritnum* cannot mean the director of good action—*rûpa* never means *karma* (i.e., action). The most apparent meaning, however, is “that which causes excellent form or beauty.” The expression *ûtayê* has not been logically explained by *Sâyana*. *Sududhâm* will by no stretch of imagination mean a milch cow. It is a compound of *su*, *du*, and *dhâm*, and gives the meaning “the giver of good and evil results.” *Gôduhê* cannot be taken to be in the dative case. The word *juhûmasi* is not to be found in any *Nighantu*, nor even in the *Nirukta*. There are, however, the



words juhuvat, juhû and juhûvat, which respectively mean "Yajña," "an instrument used at a Yajña" and "Agni." The verb juhôti cannot in any tense or mood take the form juhûmasi. Dyâvidyâvi is taken to mean "every day" solely on the authority of the Nirukta. It does not occur in any other Nighantu or Amara.

In the face of these inconsistencies we feel bound to disregard the translation as a whole. It need not be repeated that the meaning given by Sâyana, does not assist us in gaining knowledge through Yajña or experiment, which is the chief function of the Vedic mantras. Before we proceed to explain the verse in the light of the new method of investigation, we wish to answer an objection that may be brought to bear against the trend of the argument followed above. Why cannot we, it may be asked, take the existing translation to be correct, and consider that the modern Nighantus and Amara do not record the meanings of certain words used in the Vedas inasmuch as their authors have lost the significance of these words, and that the grammar, as we possess it now, is not the one which was in use among the ancients? We cannot do so because, in the first place, by granting such an assumption, we will be confronted with the dilemma that since there are about 10,580 verses in the *Rig Veda* alone each of which, as explained at present, contains one or more words whose significance we have lost,—that will be the conclusion because these words are not to be found in the extant literature,—there will be more than 10,000 words which the Hindu nation must be supposed to have missed and forgotten within the short period of at the most five thousand years—an incredible phenomenon even in Nature which abounds in catastrophies and revolutions sudden and certain.

Secondly, the assumption is in direct opposition with the

declaration of the highest authority, Jaimini, who has emphatically opined that the words used in the Vedas have the same meaning that they are known to possess in other and more common literature. In the third place, this untenable assumption becomes extremely futile, and appears to originate out of an unrestricted indulgence in the vain apprehensions of an un-Hindu mind, when we discover the truism that the strict adherence to proper *padavibhāga*, that does not in the least interfere with grammar and the involved scientific principle, leaves only very few words for whose meaning we might have to have recourse to the Nirukta. Were this not the actual case, we will have to impeach man in general and the Rishis in particular of carelessness, selfishness and even unmanliness that are not to be found even among the creatures far below him in the scale of evolution. Nay, we will have to pass our verdict against one of the chief laws of Nature and consequently against Nature itself; for, if we admit the validity of the assumption, it would mean that the Rishis had neglected and had prevailed over their fellow-humanity to neglect the principle of perpetuation of species—the species possessing the knowledge that by inheritance belongs to them.

Next comes the question of grammar. It is often asserted that the grammar of the Vedas is too difficult to follow, thus implying a hypothetical observation that the Vedic grammar is wholly different from the modern one. But no sooner do we divest ourselves of blind obstinacy and superstition, which have resulted from ignorance of the real meaning and nature of the Vedas, than we will perceive that this is a misconception, which has assumed a certain inherent probability in virtue of time. It is not meant to suggest that there are no peculiarities in the Vedas which have

not been recorded in our ordinary treatises on grammar. But all that we intend to say is, that when this problem is viewed at from the standpoint already set forth in the first chapter, it falls to the ground of its own accord. If we are endowed with the faculty of effecting a proper *padavibhāga* of the texts, or as it is said, if we know "*when the final letter becomes an initial and the initial becomes final*," then, as has been shown in the few verses that have already been explained and as will be shown in what follows, no necessity for the assumption will present itself. Moreover, the avowal of the veracity of the assumption will demand from us a not-forthcoming explanation as to the fact that all the commentators, ancient and modern, have always been guided by the extant grammar. Certainly, at least the mediæval commentators, could not have foregone such an invaluable resource, if one did exist, especially when they had fully realized that grammar was one of the "limbs" of the Vedas.

We therefore give the new version of the verse thus:—

SURUPAKRITNUM UTAYE SUDUDHAMIVA GODUHE JU-  
HUMA SIDDHA VIDYAVI.

*Padavibhāga* :—

Su, rū, pah, kritnum, ūtayē, su, du, dhām, iva, gō,  
duhē, juhūma, siddha, vidyā, vi.

In connection with this verse of the Samhita, there is a text of the Aitarēya Brāhmaṇa : namely, Ūtaya khalu vai tā nāmayaḥbhīḥ dēvā....., purporting to inform us that ūtaya is the name of a distinct *Deva*. The same Brāhmaṇa further says : Panthānah yah srutayasta vā ūtayasta, which means :—  
"Ūtaya is so called because he moves along the road (the wire) flowing like a fluid." Sāyana derives the word ūta from the root ava, to protect. The *Deva* who protects all other

*Devas* and all the manifestation is Indra. The term designates Indra or electricity. That this is so is evident from the following two verses of the *Rig Veda*, in the last of which the expression *ûtaya* occurs.

“(R. V. X. 81, 1, 6.=S. V. 2, 939.) *Visvakarman havishâ vâvridhânah svayam yajasva prithvîm uta dyâm, muhyantu anyê abhitô janâsa iha asmâkam maghavân sûrir astu.*”

“(R. V. X. 81, 1, 7.=Vaj. S. 8, 45) *Vâchaspatim Visvakarmânâm Ûtayê manôjuvam vâjê adyâ huvêma, sa nô visvâni havanâni jôshad visvasambhûh avasê sâdhukarmâ.*”

These may be rendered into English thus :—

“The *Visvakarman*, developed by the *havis*, himself causes oxygen (*Prithivîm*) and hydrogen (*Dyâm*) to combine. The men who are before me here are bewildered (at this act of electricity.) *Maghavan* (*i.e.*, Indra or electricity) is learned indeed.”

“Let us to-day invoke at our experiment the *Ûtaya Deva*, the Lord of *Vâk*, the *Visvakarman*, who is swift as thought. May he who is the source of all prosperity, the universal *Sambhû* (electricity), make fruitful (these) proper experiments.”

Thus, then, *Ûtaya* = *Visvakarman* = *Vâchaspati* = *Indra* = Electricity.

*Surûpakritnum* certainly means that which causes excellent beauty or form, but that is not the meaning here. The expression has four *anudâtta*s, which separate it into four words, namely, *su*, *rû*, *pah*, and *kritnum*. Of these *su* means “directing or effecting,” *rû* “dividing or dissociating,” *pah* “water,” and *kritnum* “an artificer or agent.” Thus *surûpakritnum* means the agent which effects the decomposition of water—a property applied to electricity only.

*Sududhâm iva gôduhê*—here, as elsewhere in the Vedic

literature, when not used as a synonym of Prithivi, *gô* means "rays of light," not a cow. The phrase, therefore, means that which is the milker of (*i.e.*, shedder of) light, possessing both good and evil effects. *Ju* is a root, meaning "to go rapidly"; and *hûm* symbolizes Indra. In this connection we must refer to the *Bija-Nighantu*—a work which gives the symbols denoting the various *Devatas*. We read in Avalon's edition thus:—*Vidâriyuktam vyômâsyam rudrarâkinî alankritam—hûm*. *Rudrarâkinî* is the electric discharge or lightning. This text means: "Hûm is that which is endowed with the power to divide (*i.e.*, dissociate), which is as though the mouth of the sky (because lightning appears in the sky producing sound), and which is adorned by (unmanifest) lightning." *Juhûvat* occurs as a name of Indra in the Vedas. *Siddha vidyâ* means "accomplished science." The *vi* with which the *slôka* ends, implies certainty.

Translation:—

*"The Ūtaya (or Indra) is that which is the cause of the decomposition of water, the giver of rays of light, possessing both good and evil effects, and the rapidly moving hûma of accomplished science."*

The Brâhmana in a succeeding *sûtra* further informs us that the succeeding *Gâyatrî* verse beginning with "U" gives directions as to the production of this *Devata*. Want of space compels us to restrict our remarks to our own explanation without commenting on that of other investigators.

The second verse of this first hymn to Indra is as follows:—

UPANAHA SANAGAHI SOMASYA SOMAPAHPIBA GODA  
IDREVATE MADAH.\*

\* Its extant reading is:—Upa nah savanâghi sômasya sômapah piba, gôdâ idrêvatê mada/i.

This is the correct form of the second verse of this *varga* and its *padavibhāga* is as follows:—

Upanāha, sa, nāga, ahi, sômasya, sômapâh, piba, gô, dâ, id, rêvatê, madah.

In the first place we have to understand what sômapâ is: and in this connection, we will have to touch incidentally on the method of preparing hydrogen from the acid *sôma* juice, as was in vogue among the Rishis, since sômpâ is obtained from the latter. According to the *Krishna Yajur-vêda*, *sôma* is an acid juice extracted by the dry distillation of the wood of the *Samî* tree (*Acacia suma*, Rox), and termed "Vasativari" or "Havishmati liquid," or as it is also called in the second *varga*, 1st Âdh. 1st Ast. of the *Rig Veda*, the "ârañkṛita sôma." Many scholars have the erroneous opinion that it is the juice of the *Sôma* plant (*Sarcostema*). An European author writes thus:—"The sôma drink known to the Europeans is not the genuine beverage, but its substitute; for the priests alone can taste of the real sôma; and even kings and rajas, when sacrificing receive the substitute. Haug shows by his own confession, in his *Aitarêya Brâhmāna*, that it was not the sôma that he tasted and found nasty, but the juice from the roots of *Nyagrôdha*, a plant or bush which grows in the hills of Poona." It is true that the real significance of *sôma* is not known to any, but this need not prevent us from inquiring into the nature of the process by which the Rishis used to extract it. Since from immemorial times the Hindu nation had cultivated the knack of inventing a custom for every grand scientific truth, which they intended to incorporate into the life of the society, it is but just and rational to expect that if the *sôma* was really the juice of the *sôma* plant, but not that obtained by the dry distillation of the *Samî* wood, there should be some custom among the

Hindus which would enable them not to miss the real *Sôma* plant. There are three kinds of *Sôma* plant not one of which is ordinarily treated by the Hindus with any sanctity and reverence. But it is different with respect to the *Samî* tree. Not only is it ordinarily held by them in high esteem, but also there is an annual ceremony connected with it. At the end of the *Navarâtri* festival, the leading gentry of every Indian village, in company with the image of Vishnu, the director of *Yajñas*, pay a visit to this important tree. Even H. H. the Maharâja of Mysore still follows this ancient custom, although its true significance is now lost. This Hindu custom, like many others of its type, must contain an involved scientific principle. Indeed, it does contain. We are told by ancient authorities such as Kâtyâyana and Gautama that the *Samî* wood contains *sôma* and other substances hidden in itself, and that a sweet flavoured juice (*svâdu*) is extracted from it which is termed the *sôma*. What can these statements inform us but the fact, recorded in the *Yajur Veda*, that a liquor and an acid are extracted by the dry distillation of this wood? We read in the *Krishna Yajurveda*, in connection with the preparation of *sôma*, thus :—*Havishmatîh imâ âpah havishmân dêvâh adhvarâh havishmân a vivâsati havishman asti sûryah*, whose purport is that “the liquid which is known as *havishmatî* is a *Devata*, i.e., a substance used in scientific experiments ; it is *adhvara* ; it gives us *sûrya* (hydrogen).”

We next proceed to consider how this “*Havismati* liquid” is prepared. The *Samî* wood is got and subjected to a process of dry distillation as directed in the *kalpa sūtra* :—

*Atha yah vîdita kumbhastam yâchati, tam âdaya antarêna chatvâlê utkara udañj upanishkramya yatra âpah sthadêti, na antamâ vahantîh, atyêti na sthâvarânâm grihnâti,*

pratiṭpam tiṣṭhan grihṇāti chchâyâyai, cha, âtapatascha sandhau grihṇāti, havishmatîḥ imâ âpô, etc.

The first sentence of this *kalpa sūtra* tells us what to do with the *Samī* wood. The root *yâcha* means not only to beg for alms, but also to heat in a closed vessel so as to obtain the volatile products. According to Amara, "Dvê yâchita ayâchitayahi yathâ sankhyâm mṛita amṛitam," and "marana sama duhkhatayâ mṛitavat bhavanti iti mṛitam." *Yâcha* is equal to *mṛitam* and *mṛitam* is that which is equivalent to death or that which gives pain equivalent to that of death. It has already been referred to that *mṛitam* is used in the scientific literature of the Hindus to denote the process of calcination or reduction (metals). Here *yâcha*, therefore, means to carry on destructive distillation. The meaning of the *kalpa sūtra* is as follows :—

The *Samī* wood is subjected to a process of destructive distillation having been placed in a strong retort. While (the vapour) is being produced, it lifts itself upwards and passes through the neck of the retort to condense to liquid in the *chatvâla* (receiver). The last portion is not so carried. He (the experimenter) does not take the stationary (*i.e.*, viscous) residue (wood tar). He takes the liquid (the aqueous acidulous extract) which is not stationary *i.e.*, not viscous, and which is not dark as is the other. On distilling (this liquid) he obtains the *havishmatî* liquid, etc.

This is the only logical meaning that can be derived from this *kalpa sūtra*. *Vîdita* has been explained by *Sâyana* as meaning strong, but it probably means retort-like also. *Kumbha* is, of course, a vessel with a narrow neck. It may be an earthen one. *Stha* means staying or abiding in, and is here translated by "having been placed in." *Yâchati* has been explained above. *Chatvâla* is rendered by Wilson by "a



hollow made in the ground to receive a burnt offering." It is in fact a receiver. Utkara is "that which lifts," and *udasty* means "upwards." Upanishkramya means having gone forth. Âpasthadêti has been rendered here by "condense to liquid." The rest is in easy language. Pratîpam literally means "comparing new objects with some established objects, inverse comparison." Chchâya is dark (colour) and refers to the dark colour of the tar. Therefore pratîpam chchâyâ means that which is not dark in colour. It is essential that this acidulous layer be separated from the tar, which forms the lower layer of the distillate, so that we may obtain pure acid by distilling it over again. Sandhau has been taken to mean "on distilling" because sandhika, which comes from the same root, means distillation.

The literature dealing with this subject is too much to be conveniently incorporated here. We therefore cut short this theme by the concluding remark that this "Havishmatî liquid" contains acetic acid; for the latter is one of the products of dry distillation of wood. Nay, the acetic acid on the market is entirely obtained from this aqueous extract. It contains an atom of hydrogen replaceable by a metal. The term *lata* which occurs in the expression *Sômalata* does not weaken our position because *lata*, meaning a creeper, twig, or thread, is used here to denote the icicle-like appearance of glacial acetic acid. Nor is this reasoning inconsistent with the popular notion that the *Sôma* juice is an intoxicating liquid, because the distillate contains acetic acid as well as methyl alcohol.

The next question to be considered is how *sômapâ* is obtained. We have the following *slôka* of the *Rig Veda*:

VAYAVAYAHEH DARSATAH IME SOMAT ARANKRITAT

TESHAMPAHI SRUDHI HAVAM.\*

*Padavibhāga* :—

Vāyava, āya, ahêh, darsatah, imê, sômât, arañkritât, têshâm, pâh, hi, srudhi, havam.

Its prose order is as follows :—

Ime vāyava darsatah āya arañkritât somât, (cha) ahêh ; têshâm pâh srudhi havam hi.

The words vāyava darsatah denote hydrogen since their literal meaning is "the gaseous sun," or more explicitly, the gaseous matter of the sun's chromosphere. We know it to be the element hydrogen. In order to signify that the acetic acid obtained by the dry distillation of *Samī* wood has been freed from the other reagents that are obtained along with it, the term arañkrita is used. Arañkrita sôma is, therefore, a term applied to pure acetic acid. Ahi is iron. Hi means "surely."

Translation :—

*Hydrogen is obtained from (the interaction of) iron and acetic acid ; the solution (têshampâh) that is left behind (after hydrogen has been displaced) is known as havam.*

Sômapâ is here clearly designated as havam (or havis), and stands for the ferric acetate solution. The term "Havish-mati" used to denote acetic acid, therefore, means that the acid gives rise to this "havis," from which, as we are informed by the verses quoted on page 165, Visvakarman or electricity is developed.

The intelligent reader might have already surmised that the former verse deals with the galvanic method of preparing the electric current. A galvanic cell consists essentially of two rods of different metals, partly immersed in a solution of a salt of one of the metals, and connected together outside

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\* Its extant version is :—Vāyavāyâhi darsatêmé sômâ arañkritâh têshampâhi srudhi havam.

the solution by means of a fine metallic wire. This exactly is the experiment most ingeniously compressed in this verse of 24 letters. The two metal rods are those of ahi (iron) and nâga (lead). The salt used is the ferric acetate prepared according to the verse mentioned above. The word upanâha, denoting as it does the keys of a Vîna with their fastened metallic strings, gives us the idea that the two metals used for the experiment are in the form of rods and connected together by means of a fine metallic wire such as is used for a Vîna. "Upanahyanti tantryô'tra upanâha. Naha bandhané"—meaning that since metallic strings are tied to this it is called upanâha. To show that the wire is fastened to the two rods the letter sa is used. Gôdâ means giving light, not giving cows. Rêvatê comes from the roots rêvri, "to go by leaps or jumps," or "to flow like a river (current.)"

Of course, to explain all these intricate points we do require the assistance of a Guru, and hence the oft-repeated admonition that without a Guru we cannot understand the Vedas, and therefore should not even open them.

The verse means :

*When the rods of iron and lead to which a fine wire is fastened at its either end, as in a Vîna, have drunk the solution of ferric acetate, the madah (a fluid), which possesses supreme power, flows along (the wire) giving us light.*

The use of the term madah here gives us a significant though vague idea of the relation between the energies of Nature and emotions that the living objects manifest.

Did the Rishis know anything more about the electric current? This is the next question to answer which we only quote here a few more verses from this hymn. The third verse of this hymn addressed to Indra runs thus :—

ATHATE'AMTAMANAM VIDYAMASU MATINAM MANO'  
ATIKHYATI AGACHCHATI.\*

*Padavibhāga :—*

Atha, tē, ām, tamānām, vidyām, asu<sup>h</sup>, matinām, māna<sup>h</sup>,  
ati, khyāti, āgachchati.

Prose order :—

Atha tē ām, tamānām vidyām, matinām asu, atikhyāti  
māna<sup>h</sup>, āgachchati.

Ām is the symbol representing Indra or electricity in the scientific nomenclature used by the Rishis. Bījanighantu says that ām is the symbol representing Siva or Hara, both of which mean Rudra which denotes the electric current.

Translation :—

*Now (in this experiment) is produced that Ām (electric current), which gives knowledge to the ignorant and thought to the mind, the agent which makes us know much.*

The next verse is as follows :

PARESHTI VIGRAHASTUTAM INDRAM PRICHCHA VIPA-  
SCHITAM YASTE SAKHIBHYA AVARAM.†

*Padavibhāga :—*

Parēshti, vighram, stutam, indram, prichchā, vipaschi-  
tam, yah, tē sakhibhya, āvaram.

Translation :—

*People ask the learned brāhmanas (scientists) why Indra is praised as the body of the Almighty. Who, by his association, surrounds all this ?*

The latter part of this verse contains the answer to the question implied in the former part. The recently promul-

\* The current version of the verse is—Athātē'amtamānām vidyā masu matinām mānō'atikhya āgahi.

† The extant reading is :—Parēhi vighramastritamindram prichchā vipaschitam, yastē sakhibhya āvaram.

gated electron theory of matter is implied in this *śloka*. This will be confirmed when we consider the theory of *Māyā* which will be taken up in the following chapter.

Verse :—

UTABRUVANTI NO NIDO NIRANYATASCHIDARATA  
DADHATI INDRA IDDHAVAḤ.\*

*Padavibhāga* :—

Uta, bruvanti, nah, nidaḥ, niranyataḥ, chit, ārata, dadhāti, indra, iddha, vaḥ.

Nah means "one who is praised." Here it refers to Indra. Nir is "a particle and prefix implying certainty, assurance, or negation." Niranyata, therefore, taking nir to imply certainty, means otherwise. Nidaḥ is obtained from ni, 'an' affirmative prefix, dô, to destroy, and the affix ñ. It is here taken to mean "a destructive power." Wilson translates it by "poison." Iddha is translated by Wilson by "Sunshine, light, heat." It is the glow which combines light and heat, emanating from the electric discharge. Vaḥ means "a dwelling." Ārati is "Stopping, ceasing."

Translation :—

*Also they (the learned brāhmanas) say that the above-mentioned Indra, whether glowing or otherwise, possesses a destructive power which puts an end to life.*

Verse :—

UTANAH SUBHAGAN ARIRVACHEYAH DASMEKRIHTAYAH  
SYAMEDINDRASYA SARMANI.†

*Padavibhāga* :—

\* The extant reading is:—Utābruvantu nō nidō niranyataschidārata dadhānā indra idduvaḥ.

† The extant reading of the verse is :—Utanah subhagām arirvōchēyur dasma kristayah syāmēdindrasya sarmani.

Utah, nah, subhagân, arih, vâh, châyah, dasmê, krishtayah, syâma, id, indrasya, sarmâni.

Subhagân is here used to denote Indra, the electric current. It means "pleasing to the eye." Vâh is the plural of vâ which means an arrow. Arirvâh is, therefore, taken here to mean the arrows of the enemy. Krishtayah is the plural form of krishti which means "attracting or drawing." So that krishtayah arirvâh signifies the attractable arrows of the enemy. Châyah is translated by Wilson by "to be gathered or collected." Dasma is fire. Id means "supreme power."

Translation :—

*Moreover, the above described Subhaga (i.e., Indra), directs the attractable arrows of the enemy (during a fight) to be concentrated (and thrown) into fire. We live in happiness on account of this supreme power of Indra.*

Of these four verses, the first two speak of the general properties and the last two of the technical uses of current electricity, as known to the Rishis and as recorded in this portion of the Rig Veda, and these are substantiated by modern discovery. We have not yet learnt how to produce electricity by psychic means and to make use of it in warfare, and until that power is achieved, we cannot be sure of the end of Adharma's reign. All signs point out that India will revive this long-lost art, and thus incidentally fulfil the solemn wish of one of her adepts :—"May thy awakening astonish that Occident, decadent, mean, daily dwindling, slayer of nations, slayer of gods, slayer of souls, which yet bows down still, ancient India, before the prodigies of thy primordial conceptions."

Let us now pass on to the consideration of other verses, those of the Vargas 3 to 6 both inclusive. In connection

with the expression *dâsusha* we had occasion to refer to the *Aitarêya-Âranyakam*. We now proceed to consider the remarks of the *Âranyakam* with respect to the explanation of these verses.

But, before doing so, it is desirable that we should draw the attention of the reader to what the *Âranyakas* really are. It is plain enough that they are explanatory notes on the *Vedas*. They are composed by the *Rishis*, who had actually tested the veracity of the propositions recorded in them, and obtained the results enumerated in the *Vedas*. During their study and experimentation in the forest-laboratories, such as the *Naimisha*, the *Rishis* found that it was impossible to arrive at the real meaning of the *Vedas*, unless and until the significance of certain technical expressions was fully grasped. In order to enable their posterity to understand the *Vedas*, they recorded these technicalities and intricacies, and explained them in an easier language and metaphor than those of the *Vedas*. It is these records that are termed the *Âranyakas*.

The necessity to locate the laboratories in forests arose out of a series of considerations of which we shall mention here only a few. It is a matter of common knowledge that the organization of *Guru* and *Sishya* was divided into esoteric and exoteric circles. Underlying this demarkation there was the primary idea that true scientific knowledge should not be imparted to the profane. In order to easily achieve this purpose the *Rishis* sought the hospitality of the generous forests. In the second place, they felt that were they to assemble in towns and cities, they would be subjected to frequent interruptions and needless cumbrance. They knew that many members of their community liked isolated spheres of action and would not care to attend scientific conferences held in

towns and cities. One of the conferences, that which was held in the *Naimisha*, lasted twelve years, and it would certainly have been intolerable to them, who were accustomed to live in unfrequented *Āsramas*, to put up with a life totally foreign to their very natures for such a long time. Thirdly, in the forests they could get all varieties of substances, organic and inorganic, for the preparation of chemical reagents with the least effort and delay. At the same time they would be preventing their secret learning from "leaking out." With these ends in view the ancient scientists, not only in Hindustan, but all the world over, felt it indispensable to erect their habitations and laboratories in wilderness and out-of-the-way tracts.

The third *Khânda*, 1st *Ādh.*, of the first *Āranyaka*, gives us directions as to which of the verses are to be used in the performance of the *Pra-Uga*, which consists of a series of experiments in which certain chemical elements are prepared with a view to be used in subsequent experiments. Below is given the English rendering of these passages.

"Some say: 'Let him (student) take a *Gâyatrî* hymn for the *Pra-Uga*. Verily, *Gâyatrî* is the splendour and power of the *Brāhmaṇa* (scientist), and he who experiments according to *Gâyatrî* hymn becomes endowed with splendour and power.'

"Others say 'Let him take a *Ushnih* hymn for the *Pra-Uga*. Verily *Ushnih* is life and thus the experimenter gains a long life. Let him take an *Anushtubh* hymn for the *Pra-Uga*. Verily, *anushtubh* is the power of the *Kshatriya* and it serves for obtaining the power of a *Kshatriya*. Let him take a *Brihati* hymn for the *Pra-Uga*. Verily, *Brihati* is wealth and thus the experimenter becomes wealthy.....'



“But we say: ‘Let him take a Gâyatrî hymn only. Verily, Gâyatrî is Brahman (the lower Brahman comprising of the objects of the physical sciences) and the experiment is (for the attainment of) Brahman (*i.e.*, the objects of the physical sciences.) Thus he obtains Brahman by Brahman.’

“‘And it must be a Gâyatrî hymn by Madhuchandas.’

“For Madhuchandas is called Madhuchandas because Madhuchandas covers the madhu (the primary facts and principles of physical sciences) for the Rishis.”

From these passages it is evident that those Gâyatrî verses which are attributed to Madhuchandas, contain the more important facts of the exact sciences. We may, therefore, expect that these verses will give us the necessary instructions for the preparation of the chemico-physical Agents of Nature. Indeed, we have already shown that the methods for the preparation of oxygen, electricity, and hydrogen are mentioned in the hymns attributed to Madhuchandas.

The Âranyaka then goes on to explain the Gâyatrî verses required for the Pra-Uga. They begin with the 3rd varga and end with the 6th varga of the first Âdhyâya of the first Ashtaka of the Rig Veda. These are divided into seven *trichas*, a *tricha* being a set of three verses. With respect to the first *tricha*, which deals with the preparation of hydrogen, the “vâyava darsatah,” the Âranyaka has the explanatory text whose correct reading we take to be:—

Vâyavâyâhé darsatah imé sômât aramkritât ityêtadvâ ahiraram yajamânâyacha dēvēbhyascha.

The Âranyaka wants to make clear the meaning of the words ahi and aram. It says that the two words, namely, ahi and aram, which occur in the verse, are required “for experimenting and for (producing) the *Devas*.” Ahi is iron, and aram stands for the aramkrita sôma or the “Havishmati

liquid." In the succeeding sūtra it is further said that "the result is to those who know these substances, *ahi* and *aram*, or for whom a *vidvân* (scientist) who knows them experiments."

The first verse of this *tricha* has already been explained (p. 171). The second verse reads as follows:—

VAYO UKTEBHIRJARANTE TWAMACHCHAJARITARAH  
SUTASOMA AHARVIDUH.\*

*Padavibhāga* :—

Vāyo, uktēbhīh, jarante, twām, achchā, ajah, ritā, rah, sutasomā, ahaḥ, viduh.

Achchā means crystalline. *Ajah* is a synonym of the mineral *Mākshika* which is iron pyrites. *Rah* is a name of *Agni*, i.e., oxygen. *Rita* (*rikta*) means removed of, or purged of. *Achchājaritārah*, therefore, means: "reduced crystalline iron pyrites." When iron pyrites are heated in air, the sulphur gets oxidized and escapes as sulphur dioxide, and ferric oxide is left behind. The reduction of this oxide gives pure iron. That this process of smelting iron was employed by the ancient *Bhāratīyas* is an admitted fact. Yet we may do well to give here some extracts from well known authors. Professor Wilson says: "Casting iron is an art that is practised in this manufacturing country (England) only within a few years. The Hindus have the art of smelting iron, of welding it, and of making steel, and have had these arts from time immemorial." Dr. Mellor writes, in his "Modern Inorganic Chemistry," thus:—"Iron is frequently mentioned in the sacred writings. The process of smelting iron is supposed to have originated in the East, and the Hindus acquired considerable skill in the manufacture of wrought iron."

\* The extant reading of the text is:—Vāya uktēbhīrjarantē twām achchā jaritārah sutasomā aharvidah.

The phrase *sutasômâ* means the distilled *sôma*. The aqueous acid extract obtained by the dry distillation of the *Sami* wood, must be redistilled in order to obtain the pure acid. *Sutasômâ* refers to this acetic acid. *Suta* comes from the root *shu*, which means not only "to bring forth," but also "to distill or to extract a spirit."

Translation :—

*The iron that is obtained by the reduction of crystalline iron pyrites develops (i.e., displaces) hydrogen in experiments carried on according to the Ukta hymns of the Sâma Veda. (The scientists) know that acetic acid is (the means of) the experiment.*

The next *tricha* declares that *Indra* and *Vâyû* are obtained from acetic acid. We have already explained that *Indra* is electricity and that *Vâyû* designates hydrogen. The preceding *tricha* informs us that by the action of iron on the acetic acid or the *sutasômâ* we obtain hydrogen, and that the solution which contains the ferric acetate is known as *havis* or *havam*. We have also explained how the electric current is developed from this *havis*.

The first verse of this *tricha* is as follows :—

INDRAVAYU IME SUTA UPA PRAYOBHIRAGATAM INDAYO  
VAMUSANTI HI.

*Padavibhâga* :—

*Indrah, vâyuh, imê, sutâ, upa, prayôbhih, âgatam, indavah, vâm, usanti, hi.*

Here *suta* stands for the acetic acid which is obtained by distilling off the alcohol from the acidulous extract got by the dry distillation of *Sami* wood. *Prayôbhih* means "by experimenting" and *upa* is an affix meaning "over and again." *Indavah* is the plural form of *indu* which is *sôma*, the liquid acetic acid or the "Havishmati liquid." *Usanti*

coming from the root Vas, "to desire, to will, to wish," is here taken to mean "give rise." Vâm means "to these two."

Translation :—

*Vāyu and Indra, i.e., hydrogen and electricity, are obtained by successively experimenting (with) this acetic acid. These "Havishmati waters" give rise to these two, namely, hydrogen and electricity.*

The second verse of this *tricha* is :—

VAYAVINDRASCHA CHETATHAH SUTANAM VAJINIVASOH  
TAVAYATAMUPADRAVAT.

*Padavibhāga* :—

Vāyuh, indrah, cha, chêtathâh, sutânâm, vâjinîvasoh, tau, âyâtam, upa, dravat.

Vasu means a substance. Vâja is "the acidulous mixture of ground meal and water left to ferment." Vâjinîvasu is here taken, therefore, to signify an acidulous substance; sutânân vâjinîvasu is the acidulous substance (acetic acid) of the suta. Dravat means "flowing or oozing" or bubbling. Upa dravat is here taken to mean flowing and bubbling.

Translation :—

*Vāyu and Indra, that is, hydrogen and electricity are obtained bubbling and flowing respectively from the acidulous substance of the suta extract (acetic acid.)*

The terms bubbling and flowing, when applied to Vāyu and Indra respectively, are quite intelligible. We know that when iron acts on an acid bubbles of hydrogen are given off, and that the electric current is the flowing electricity.

The third verse is :—

VAYAVINDRASCHA SUNVATA AYATAMUPANISHKRITAM  
MAKSHANTITTHA DHIYAI NARAH\*

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\* The extant reading of the verse is :—Vāyavindrascha sunvata âyâtamupa niskritam, makshvîttâ dhiyâ narâ.

*Padavibhāga* :—

Vāyuh, indrah, cha, sunvatah, āyātam, upa, nishkritam, makshanti, dhiyai, narāh.

The word nishkritam has been translated to mean samskritam by the Âranyaka in the sūtra "Indravāyu imē sūtā āyātam upanishkritam itiyadvai nishkritam tat samaskritam." We have explained that samskritam means the effecting of a chemical composition or generally a chemical reaction, and therefore is here translated by experimenting. Sunvat is translated by "sacrifice." Of course, this sacrifice only means an experiment.

Translation :—

*Hydrogen and electricity are obtained by experimenting according to these experiments. Ye men ! mix (the reagents) as directed for (obtaining) electricity.*

Note that dhiyai has been rendered by "for (obtaining) electricity." We have had occasion to translate dhiyā by "through electricity" once before.

Relating to the third *tricha* we have the Âranyaka text : "Mitram huvē pūta daksham dhiyāmghritāchīm sādhanām iti vāgvai dhirghritāchî," which instructs us that the term dhiyāmghritāchīm means Vāk (electricity). The first *śloka* of this *tricha* is as follows :—

MITRAM HUVE PUTADAKSHAM VARUNANCHA RISADASAM  
DHIYAM GHRITACHIM SADHANTA.

On this verse there is a recent commentary from a scientific standpoint, which is quoted below in order to show how, during the past three or four decades, the Hindu mind has been striving to unveil the mystery of the Vedas.

"The Hindus hold," writes Har Vilas Sarada in his "Hindu Superiority," "that the Vedas contain the germs of all knowledge and that their teachings are in complete

consonance with the principles of science. The late lamented P. Guru Datta of Lahore attempted to interpret a few mantras of the *Rig Veda* on the strength of Swami Dayananda Saraswati's commentary on the Vedas. The result was astonishing. Interpreting the seventh mantra of the second *sūkta* of the *Rig Veda* (the above verse), P. Guru Datta says 'This mantra describes the (*dhiyam*) process, or steps, whereby the well-known of liquids, water, can be formed by the combination of *two* other substances (*gritachim sadhanta*). The word *sadhanta* is in the dual number indicating that it is two elementary bodies which combine to form water. What those two elementary substances, according to this mantra, are, is not a matter of the least importance to determine. The words used to indicate those two substances are *mitra* and *varuna*.'

“ ‘The first literal meaning of *mitra* is measurer. The name is given to a substance that stands, as it were, as a measurer of density, or of value otherwise known as quantivalence. The other meaning of *mitra* is ‘associate.’ Now in this mantra, *mitra* is described as an associate of *varuna*. It will be shown how *varuna* indicates oxygen gas. Now it is well-known that hydrogen is not only the lightest element known, nor is it only monovalent, but that it has a strong affinity for oxygen; hence it is that it is described as an associate of *varuna*. Many other analogies in the properties of *mitra* and *hydrogen* go on to suggest that what is in Vedic terms styled as *mitra* is in fact identical with hydrogen. *Mitra*, for instance, occurs as synonymous with *udana* in many parts of the Vedas, and *udana* is well characterized by its lightness or by its power to lift up.’

“ ‘The second element with which we are concerned is *varuna*. *Varuna* is the substance that is acceptable to

all. It is the element that every living being needs to live. Its well-known property is *rishada*, i.e., it eats away or rusts all the base metals, it burns all the bones, etc., and physiologically purifies the blood by oxidizing it, and thereby keeping the frame alive. It is by these properties that *varuna* is distinguished; but it is especially characterized here as *rishada*. No one can fail to perceive that the substance thus distinctly characterized is oxygen.'

"Another word used in the mantra is *putadaksham*. *Put* is pure, free from impurities. *Daksham* means energy. *Putadaksham* is a substance pure, possessed of kinetic energy. Who that is acquainted with the kinetic theory of gases cannot see in *putadaksham* the properties of a gas highly heated?'

"The meaning of the mantra taken as a whole is this: Let one who is desirous to form water by combination of two substances, take pure hydrogen gas highly heated and oxygen gas possessed of the property, *rishada*, and let him combine them to form water.'"

In this explanation *dhiyam* has been wrongly taken to mean a "process," evidently owing to the failure on the part of its author to take notice of the above mentioned *sūtra* of the *Âranyaka*. The word *dhiya* occurs again in the first verse of the seventh *tricha* combined with *vasuh*, where too, the *Âranyaka* translates "*dhiyâ vasuh*" by *Vâk*. We have already shown that *Vâk* is synonymous with electricity. Moreover, *ghritâchî* is the name of an "apsarasa," an inhabitant of *Deva Lôka*, and one of Indra's attendants. It must also be observed that in the Vedas the term "*ghrita*" does not mean clarified butter for which it has been mistaken by the modern ritualists and commentators, but on the other hand, it means "that which flashes or illuminates," namely,

lightning or electricity. *Dhiyam ghrîtâchîm* is, therefore, that which contains what flashes (lightning) in an unmanifest form. It is here used to signify the electric current. The word *mitra* is a synonym of the sun and hence, also, it means hydrogen.

Translation :—

*Hydrogen, the pure Daksha (prajāpati), and oxygen, the oxidizer, combine through electricity.*

The next two verses of this *tricha* say that *mitra* and *varuna* combine to form water.

At this stage there is a sudden change in the theme of the verses, as we should expect from the remark made in an earlier portion of the *Âranyaka*, which is to the effect that these seven *trichas* together with the verses 8 and 9 of the first hymn addressed to Agni, and the verses 1 and 2 of the first hymn addressed to Indra, contain the salient factors of the positive sciences. Hitherto, we were informed only of a few chemical preparations and methods. Now we pass on to the consideration of some physical principles. The fourth and the fifth *trichas* deal with what to us is the farthest development of physics—the discharge of electricity in attenuated gases. It will be presently proved that the *Rishis* knew more about the radiations issuing from the radioactive matter than what we do at this zenith of scientific discovery. There can be, we are sure, no error in the method of investigation followed here, since we are not guided by any preconceived superstitious reverence of the *Vedas* nor by any ill-founded prescriptive authority, but by the most natural and direct meaning that the verses give us on a deep study. All that we demand of the unprejudiced reader is to try to understand the following interpretation in the light of what has been attested hitherto, and to have no misgivings whatsoever about



two principal facts that go a long way to help us in deciphering this portion of the *Rig Veda*. On the one hand he must clearly understand that the tremendous strides which we have been taking lately in the domain of physical sciences, are admittedly but the crawlings of a snail compared to those that we have in store for the future; and on the other hand he must, by an unbiased consideration of the achievements of our ancients, admit the possibility of their having been in possession of this knowledge. Although it is neither paying nor just on the part of our critics to ignore the leading facts of our ancient literature, mainly on the assumption that they could not have been possible in the olden days,—the common belief being that it is only after a great deal of experimentation and inductive reasoning, neither of which were known to the ancients, that we were able to enrich our literature with similar facts,—yet this neglect has been a matter of fact, fostered and sustained by most of our learned commentators; and the patient Hindu has not protested against this hypothetical and absurd doctrine of the fanciful critics. In this crucifixion of facts they not only cannot and would not perceive a bleeding Christ, but also are forming arrays to fight out the coming one, too.

The fourth *tricha* is concerned with the Anode and Kathode rays of the discharge tube. In order that the reader may fully understand the scientific facts connected with this subject, we quote here the description of the phenomena that happen when electricity is passed through gases at low pressure.

“When a current of electricity from an induction coil or influence machine is sent between two metal electrodes fused into the ends of a glass tube (say 12 inches long) from which the air is gradually withdrawn by a pump, the tube presents a continuous succession of striking appearances.

"At high pressures, air is a very bad conductor of electricity; and a large force is necessary to produce a visible discharge while the pressure remains in the region of atmosphere. But a reduction of pressure facilitates the passage of the spark, which after a time loses its noisy character and is replaced by a collection of sinuous and irregular pink streamers which latter broaden and fill almost the whole of the tube with a pink diffuse glow known as the *positive column* .....

"Meanwhile the kathode—the electrode by which the current leaves the tube—assumes at its top a luminous tuft—the *negative glow*—violet in colour, which later grows until it completely envelops the kathode. Between these two luminous glows comes a darker ill-defined region called the *Faraday dark-space*. These general appearances correspond to a pressure of some 8 to 10 millimetres of mercury.

"As the pressure is further reduced, the anode becomes tipped with a vivid speck of glow, and the positive column proceeds, if the current density is suitable, to break up into thin fluctuating pink discs or striæ, which subsequently thicken and diminish in number, intensity and extent. The Faraday dark-space enlarges, and in the meantime (at about 1 mm. pressure), the violet negative glow increases in brightness and volume, and the glass walls of the tube are seen to fluoresce with an olive-green light which, as J. J. Thomson (P.C. P. S. 1910) has shown, is due to the action of extremely active ultra-violet light from the negative glow.

"As the exhaustion proceeds, this fluorescence disappears, the negative glow detaches itself like a shell from the kathode, while a new violet film forms and spreads over the surface of the kathode. Thus the negative glow now consists of two

parts: they are separated from each other by a narrow dark region called the *Crooks or kathode dark-space*, which has a sharply defined outline running parallel to that of the kathode.

"With a reduction of pressure, the dark-space increases in width, and pushes the outer negative glow before it. The dark-space is often used as a rough indication of the pressure, though its width depends also on both the current density and the metal of the cathode, and is not really a reliable guide to the degree of exhaustion.

"With higher rarefactions (say  $1/50$  mm.) both positive and negative glows become less bright and definite in outline, and finally lose almost all trace of luminosity. Meanwhile the kathode dark-space has grown at the expense of all else, until finally it becomes so large that its boundaries touch the glass walls of the tube. It is at this stage that the tube begins to shine, first in the region of the kathode and then (as the dark-space extends) over its whole surface, with the brilliant apple-green fluorescence well known to those who are accustomed to the X-ray tubes.

"..... If the exhaustion is pressed still further, the fluorescence diminishes, and the resistance of the tube increases, until finally it becomes impossible for the discharge to pass at all.....

"The above are the more salient features to be observed in a discharge tube. .... ."\*

In this description of the phenomena of a discharge tube, the pink diffuse glow of the positive column, the violet luminous negative glow, the intervening Faraday dark-space, the pink discs or striæ, the fluorescence, the Crooks or kathode dark-space, and the ultimate shining of the tube all over its surface with the brilliant apple-green fluorescence, are the

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\* G. W. C. Kaye's "X-rays."

most striking ones. Let us now enquire whether the Vedic scientists knew these most important phenomena of Nature.

There is nothing new in stating that Marutvân (that is, one who possesses Maruts) is a term applied to Indra (electricity); but it is quite a new declaration to say that these Maruts are the rays of the discharge tube. In some of the *Purânas*, Maruts have been spoken of as originating from Rudra. Nay, the Veda itself admits it. Rudra is "he who once upon a time cried for having to *incarnate i.e.*, take a new birth." This is the derivation of the term Rudra. He is the supreme *Devata* of the *Rig Veda*. He is in fact Indra himself. The once upon a time alluded to in the derivation of the term Rudra, is that time when the change of the electrical energy into the rays of the discharge tube takes place. Rudra stands for the creative energy of the Universe. He is represented in the *Purânas* as possessing a body of which half belongs to himself and the other half to his spouse, Pârvatî. This latter is the daughter of the mountain Himavat (the Himâlaya). What but a stream of negative electrification is "born" from the top of the mountain Himavat? Rudra is then the electric current in the act of transforming into the rays of the vacuum tube. He is the creator of the host called the Maruts from his own self. Moreover these Maruts are not infrequently addressed as the *Gana Devatas* attending on Rudra (electricity).

Another version of the origin of the Maruts is that they are "the sons of Diti, formed of the divisions of the foetus in utero, by the Vajra, or thunderbolt of Indra, and to be named from that deity's addressing the foetus he thus divided by *mârôdîh* weep not" (Wilson). It is clear from this that the Vajra or the electric current is the agent from which the Maruts take their origin. Further, it reports that this

electric current gets broken up in the womb of the tube,\* and that these electric particles are what are called the Maruts.

Maruts are generally supposed to be the "Storm-gods" whatever the term may mean. They can never represent these imaginary "Storm-gods" inasmuch as they are objective agents used in the (Yajñas) experiments. To them is the sôma "offered," which they evidently "drink." The Rishis were acquainted with an experiment in which the sôma was "offered" to Indra (electricity). But the Rishi Chyavana, during his researches, was the first to derive some valuable results by "offering" it to the Maruts, and this is recorded in a story of the Bhâratam. Good many verses may be cited even from the translations of modern commentators, which go to prove that they are agents used in experiments. That they are ray-like in appearance is evident from the following statements of the *Rig Veda*.

"If you (Maruts), sons of Prisni [discharge tube (?)]  
.....I. 3. 15-17.

"To every Yajña you hasten together, you accept prayer O quick Maruts. Let me therefore bring you hither....." I. 4. 6-7, 1.

"They whose terrible name, wide-spreading like the ocean, is the one of all that is of use, whose strength is like the vigour of their father (electric current)" VI. 1. 36-40, 13.

"....., self-born and self-supported, like springs, like thousandfold waves, aye, visibly like unto excellent rays (gau)." I. 4. 6-7, 2.

"O you who are armed with bright rings (discs).....  
radiant with your own splendour." VI. 1. 36-40, 4.

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\* The Sanskrit term for the discharge tube is most probably "Marudbaddha" which, H. H. Wilson says, is "a sort of vessel used in sacrifices."

"According to their wont these (Maruts) ..... bring with them *beautiful light*." VI. 1. 36-49, 7.

"You, O terrible Maruts whose ranks are never broken ..... " II. 4. 1-3.

These quotations from the "Vedic Hymns," although understood in an altogether different sense, prove that the Maruts are not the hypothetical "Storm-gods" but are actual rays, having a physical significance and therefore handled by the Rishis. They are represented as "carrying electricity (lightning) on the seats of their chariots" and as "riding on horses." They are "fast-running and impetuous hosts." They are often praised as "piercing through even forts," a significant remark affording a parallel to the penetrating property of the rays of the vacuum tube. They are innumerable in numbers. They cause lightnings and produce water. Professor Macdonnell says:—"When born from *Prisni*, the Maruts are compared to fires. They are also said to have been born from *the laughter of lightning*..... They are brothers of whom none is eldest or youngest. They have grown together and are of one mind." *Prisni* is, of course, a technical term designating the vacuum tube. The laughter of lightning is the discharge of electricity in the vacuum tube. That none of them is either eldest or youngest is plain enough; for they are generated simultaneously from electric energy. They are described as "sun-skinned, self-luminous, spotless, brilliant, beautiful..... never quarrelling with one another, accumulating in great masses (numbers)..... They are arranged in troops and battalions and their rush is irresistible....." No one who has worked with the vacuum tube will fail to perceive that this description applies to the cathode and anode rays. The expression "never quarrelling with one another" means that since each of these sets of

rays is charged with the same kind of electrification, the rays of the same set do always diverge and never collide. They are said to resemble the *Nāgās*, the *Rudras*, and the *Gana Devas* that attend on *Rudra*. We will show presently that these *Nāgās*, *Rudras*, and the *Gana Devas* are the synonyms of *Ahi* which signifies the radiations emanating from the radio-active matter. Professor Macdonnell observes:—

“Lightning is so characteristic of them that all the five compounds of Vidyut in the Rig Veda are connected with the Maruts. Their lances are often mentioned, they are lightning speared, and they have golden axes. The Maruts are decorated with garlands and other ornaments. *Armlets or anklets are an ornament peculiar to them.* ..... They have spotted steeds—an epithet which is several times and exclusively connected with the Maruts..... The Maruts are young and unaging. They are divine, vigorous, impetuous, *without soil, and dustless*. They are fierce, irascible, terrible, of terrible aspect, of fearful form.....”

The armlets or anklets and the ornaments of the Maruts are the striæ that are noticed in the tube. The spotted steeds refer to the fluorescence of the tube. That they are young and unaging is quite intelligible when applied to the rays of the vacuum tube. The expression “*without soil and dustless*” means that they are not of matter but that their material character is a result of the electric energy in violent motion. They are fierce and of fearful form because they and their form reveal to us the awful and naked truth that matter is a non-entity, being the inertia manifested by the fast-moving electron,—the electron or the *Māyā* theory of matter.

They are addressed by the Rishis irrespective of the seasons. They are often praised along with Indra (electri-

city). There are, in fact, verses which refer to the vacuum tube! The first hymn\* addressed to the Maruts is contained in vargas 11 and 12, 1st Asht. 1st Âdh. of the Rig Veda. In this hymn then, as we should expect, we are informed that they take their birth from Indra in the vacuum tube (the *Arusham*). The first verse of this hymn is as follows:—

YUNJANTI BRADHNAMARUSHAM CHARANTUM† PARITASTUSHAH ROCHANTE ROCHANADIVI.

*Padavibhāga*:—

Yunjanti, bradhnam, arusham, cha, rantum, paritastushah, rôchantê, rôchanâh, divi.

Max Müller gives his translation of this verse thus:—

“Those who stand around him while he moves on, harness the bright red (steed); the lights in the heaven shine forth.”

He takes paritastushah to mean “those who stand around him,” despite an authoritative explanation of the expression given in the Taittiriya Brâhmana. He says: “Though I do not assign great weight to interpretations of hymns, as given by the Brâhmanas, I may mention that in the Taitt. Br. III, 9, 4, 1, Paritastushah is explained as a nom. plur., ime vai lôkâh paritastushah, while Sâyana in his commentary (Sâma Veda II, 6, 3, 12, 1) has parito' vasthita lôkatrayâ vartinah prâninâh.” Since we place more confidence in the Brâhmanas than does Max Müller, we unhesitatingly take the explanation given by the Brâhmana. Paritasthu-

\* Max Müller says that “In the T. B. III, 9, 4, several of the mantras of this hymn are enjoined for the Aswamedha.” That is to say, that to perform the experiment with the X-ray bulb we must make use of these mantras.

† In the extant reading charantum reads charantam.



shah, according to the Brâhmaṇa text cited above, means "those who are all these *Lôkâs* (chemical elements)"—a property which, as modern science has once again revealed, belongs to the electrons issuing forth from the kathode and anode of the vacuum tube.

Max Müller takes bradhnam for an adjective and gives it the meaning "bright." In reality, the term is one of the names of Rudra or Siva. Bradhnam is that which destroys darkness. Darkness is here used to connote two meanings, namely, ignorance or mental darkness and absence of light. Bradhnam, therefore, signifies electricity. Rantum means a current or river. Rantum bradhnam is the moving electric current.

Max Müller has taken great pains to show that arusham is used both as an adjective meaning red, and as an appellative meaning red horse; he also remarks that it is used "as a proper name, as the name of a solar deity." He mistranslates "*ahanyaḥ na êtâsaḥ*" by "like the (solar) horse of the day," and understands the phrase to refer to the sun. But, in reality its correct translation is "as the Horse of the experiment," for *ahah* means here not the day but the experiment, or as Sâyana puts it "the sacrifice." Arusham, therefore, has an esoteric significance and is applied to the X-ray bulb which is often designated as the Horse\* of the

\* In one of the Upanishads, barren women, who are suffering from the "*Nâga arishṭa dôsha*," i.e., menstrual disorder and the consequent loss of the means of procreation, are recommended to perform the Aswamêdha Yajña for obtaining children. It is enacted therein that having prepared the Horse of the Aswamêdha in accordance with the prescribed rules, the lady who is desirous of children should sleep as though she were in actual cohabitation with him for three successive nights. This stipulation, Max Müller takes to be a barbarous practice prevalent among the ancient Aryans of India, and does nothing better than laugh at it.

*Asvamêdha Yajña*. Max Müller has rendered the term by "red (steed)" but we take it to mean merely "The Horse," where the Horse has this esoteric significance. We have, further, the texts : *Uta arushasya vi syanti dhârâh*, and *Ut jâyatâm parasuh jyôtishâ saha vi rôchatâm arushah bhânunâ suchih*. The latter sentence means "May the electric current appear with its light—may the *arusha* shine forth, bright with rays," while the former means "The streamers of *arusha* flow forth." Also in the story of *Udañka* recorded in the *Mahâ-bhârata*, we read that when *Takshaka* stole away the wealth which *Udañka* was in possession of, the latter "propitiated *Parjanya* who appeared on a Horse and directed *Udañka* how to proceed to regain his lost treasure." This *Parjanya*, as we have already seen, is the electric current and the Horse is the X-ray bulb. His advice to *Udañka* was "to excite sparks (*dhmâ*) in the ears of the Horse." No sooner did *Udañka* act as directed, than "the burning flames issuing forth through the vacant path of the current spread over the whole interior of the dwelling of the *Nâgâs*." This obviously refers to the rays of the discharge tube which are produced when the current is on, and hence the Horse cannot be other than the tube itself.

In order to remove any doubt which the reader may entertain about glass apparatus being found at so remote a period as the Vedic times, we would mention the fact that the

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He could not bring himself to a position to see that the interpretation given by him could not even be thought of, not to say put into actual practice, by even the most barbarous people that ever lived on the face of the earth ; and his training would not allow him to believe that a scientific fact was involved in this injunction. The secret of the story lies in having personified the X-ray bulb. It is called the Horse of the *Asvamêdha Yajña*, and the generative organ of this Horse can be nothing other than a tubular projection through which X-rays pass.

ancient Indians were experts in the manufacture of glass, and, "according to Pliny (about 200 B.C.), the best glass,—and consequently glass apparatus,—was that made by the Hindus."

The correct translation would therefore be :—

*They (the scientists) join the electric current and the vacuum tube, (when) the electrons, the glowing particles in the heavens, shine forth.*

We take the glowing particles in the heavens to denote the electrons because the phrase *rôchanâdivi* is intended to denote the most primitive stage of nebulous matter found in the farthest distances of the heavens, which, as our scientists are well aware, is the first stage of a future universe, and therefore, contains the electronic matter, not the gross matter with which we are acquainted.

The second verse of this hymn is as follows :—

YUNJANTYASYA KAMYA GATAM HARI VIPAKSHASARATHI  
SONA DHRISHNI NRIVAHASA.\*

*Padavibhâga :—*

Yunjanti, asya, kâmya, âgatam, harî, vipaksha, sârathî,  
sônâ, dhrishnî, nrivâhasâ.

Max Müller translates this verse thus :—

"They harness to the chariot on each side his (Indra's) two favourite bays, the brown, the bold, who can carry the hero."

He takes *vipakshasârathê* to be a compound of *vipakshasâ* and *rathê*. *Vipaksha* does not mean "on each side," but only "opposed" or "an opponent." *Asya* is taken to stand for Indra, while it should naturally be taken to stand for the experiment. *Kâmya* is translated by "favourite,"

\* The extant reading is :—Yunjantyasya kamyâ harî vipakshasârathê  
sônâdhrishnî nrivâhasâ.

whereas it should be rendered by "performed through the desire of some advantage," that is, "performed for some particular object." Harî is taken by Max Müller to represent two actual horses, as it would surely mean on the *laukika* standard, but in the Vedas, it only means "two kinds of rays." *Sôuâ* does not mean "the brown," but "the colour of a red lotus," which is a mixture of pink and violet. *Dhrishṭa* means bold, not *Dhrishṇi* which means "a ray of light." Max Müller translates *nri* by "the Hero." But it is a synonym of *nara* which means "The eternal, the divine imperishable Purusha pervading the universe,"—a term used to designate Indra, the electric energy.

The correct translation therefore is :—

*Those who perform the experiment for obtaining the Maruts (the rays of the vacuum tube) connect them (viz., the electric current and the "Horse".) Pink and violet coloured rays, moving in opposite directions, and carrying electric charges, are obtained.*

The next verse is :—

KETUM KRINVANNAKETAVE PESO MARYA APESASE  
SAMUSHADBHIRAJAYATHAH.

*Padavibhāga* :—

Kêtum, krinvan, akêtavê, pêsah, maryâ, apêsasê, sam,  
ushadbbhih, ajâyathâh.

Translation :—

*They who create light where there was no light, and form, O men! where there was no form, were produced together by the Ushas (X-ray bulb).*

Though this has been fairly correctly translated by Max Müller, little did he know that the statement "creating form where there was no form" really involved the *Mâyâ* or the electron theory of matter.

The fourth verse is :—

ADAHA SVADHAMANU PUNARGARBHATWAMERIRE  
DADHANANAMA YAJNIYAM.

*Padavibhāga* :—

At, aha, svadhām, anu, punaḥ, garbhatwam, â, iriré,  
dadhānâḥ, nâma, yajñiyam.

On the word svadhām, Max Müller comments thus :  
“Svadhâ, literally one's own place, afterwards, one's own nature. It was a great triumph for the science of Comparative Phylology that, long before the existence of such a word as svadhâ in Sanskrit was known it should have been postulated by Professor Benfey in his Griechisches Wurzellexicon, published in 1839, and in the appendix of 1842. Svadhâ was known, it is true, in the ordinary Sanskrit, but there it only occurred as an exclamation used on presenting an oblation to the manes. It was also explained to mean food offered to deceased ancestors, to be the name of a personification of Mâyâ or worldly illusion, or of a nymph. But Professor Benfey, with great ingenuity, postulated for Sanskrit a noun Svadhâ according to the Greek Etos, and the German Sitte, O.H.G. Sit-u, Gothic Sid-u. The noun has since been discovered in the Veda, where it occurs very frequently ; and its true meaning in many passages where native tradition has entirely misunderstood it, has really been restored by means of its etymological identification with the Greek Etos.

“The expressions anu svadhām and svadhām anu are of frequent occurrence. They mean according to the nature or character of the persons spoken of, and may be translated by as usual, or according to a person's wont. Thus in our passage we may translate, The Maruts, are born again.....

according to their wont ; they are always born as soon as Indra appears, for such is their nature."

Max Müller gives his translation thus :

"Thereupon they (the Maruts), according to their wont, assumed again the form of new born babes, taking their sacred name."

To this we need but add that *yajñīyam* does not mean "sacred" as is understood by Max Müller, but "appropriate to or derived from the *yajña*," which is the same as saying in consideration of their experimental properties. The phrase *yajñīyam nāma*, therefore, means "name given to them in virtue of the phenomena attending their production." That is to say, the name Marut is derived from this experiment, namely, when the electric discharge is made to pass through a vacuum tube it assumes a noisy character, while at the same time generating the anode and kathode rays or the Maruts. This noise is metaphorically spoken of in the *Purānas* as the weeping of the Maruts.

The rest of the verse has been rendered by Max Müller quite correctly and scientifically, although little did he know that the meaning given to *Svadhām anu* is the most appropriate here from a logical point of view. But the word 'thereupon' raises the question whereupon. If in the hymn we fail to find a verse that would adequately answer this question, then surely the translation must be held defective and therefore inconsistent. The continuity in the context would be found broken. Fortunately, however, *Sāma Veda* contains a proviso permitting us to read the seventh verse of this hymn after the third verse. Max Müller observes: "It may be true, as Professor Benfey suggests, that the verses here put together stood originally in a different order, or that they were taken from different sources. Yet though

the Sāma Veda would seem to sanction a small alteration in the order of the verses, the alteration of the verses 7, 4, 5, as following each other, would not help us much." Max Müller finds that no help can be derived from this proviso. But to me this much freedom seems to be necessary and sufficient to answer the difficulty raised above. The statement "Thereupon the Maruts took their birth again," presupposes an experiment that produces them. It is true that the first two verses give us some idea of the experiment, but it is a very imperfect one inasmuch as it does not enumerate all the necessary conditions. The seventh verse of the hymn instructs us to exhaust the air in the tube till very low pressure is attained. The verse is as follows :—

INDRENA SAMHRITA DRIKSHASE JAGMINO' ABIBHYUSHA  
MANDU SAMANAVARCHASA.

*Padavibhāga* :—

Indréna, sam(hrita), drikshase, jagminah, abibhyusha,  
mandû, samâna, varchasâ.

Max Müller's translation is :

"Mayest thou (host of the Maruts) be verily seen coming together with Indra, the fearless ; you are both happy-making and of equal splendour."

Max Müller translates drikshasê by 'be seen' in spite of the fact which he himself refers to in a note, that the "Tândya Brâhmaṇa XII, 2, 6, 7, reads drikshuse, and explains it by ime lōkâ dadrisirê." We have explained more than once that in the Vedic literature the term *lōkas* means gaseous elements. Dadrisirê is a compound of dadri(t) and sirê. The former comes from the root *drî* which means "to tear, to rend, to divide or to pull to pieces, i.e., exhaust." Sirê is the locative form of sira which means "any tubular vessel of the body, as a vein or a nerve, etc." It is equivalent to

"damana" which mean "blowing (a wind instrument)."

The esoteric idea connected with the term sire appears to be, therefore, that of a flexible (rubber) tube through which a fluid may be drawn out (pulled to pieces). When this is combined with dadri(t), we obtain for dadrisirê the same significance as we attach to the expression "air pump." Therefore, "ime lôkâ dadrisirê" means in the pump that exhausts the gases (of the tube.) Indrêna should here be taken not as referring to the Indra but as an abstract noun meaning supreme power. Jagmi is, of course, a term signifying the atmospheric air or generally the gases. It is derived from the root *gam*, to go, to move, etc., and as such probably involves the kinetic theory of the gases. Manda means "slow, dull, little, low (as a tone or as pressure.)" Samâna-varchasa means uniform shining.

In connection with this verse, Hindu tradition records a very oftquoted "story of Indra's being forsaken by all the Devas (elements) in his battle against Vritra, but being helped by the Maruts." The story means that the gaseous elements, namely, those which compose the gas contained in the X-ray bulb, are removed from it. Then only will the Maruts manifest themselves.

Translation :—

*By (applying) a great force to the pump, the air in the tube is exhausted until very low (pressure is attained) when uniform shining (of the tube) results.*

If we now read "Thereupon they (the Maruts), according to their wont assumed again the form of new-born babes, taking their name in virtue of their experimental properties," there will be no incongruity, and it would be easy to understand that the Maruts are the rays of the vacuum tube.

There is another story to be related in this connection,



which finds entrance into the commentaries of the ancient Vedic scholars. It tells us that the light or glow (gau) was "carried off by the Panis from the world of gods (i.e., the X-ray bulb), and thrown into darkness and how Indra *with the Maruts* conquered them (the Panis) and brought the light (gau) back." If we compare this with the modern statement that "Meanwhile the kathode dark space has grown at the expense of all else until finally it becomes so large that its boundaries touch the glass walls of the tube. It is at this stage that the tube begins to shine.....over its whole surface ....., " the resemblance is not merely striking but convincing of their identity. That the shining of the tube has an appearance similar to that of the nebular matter in the farthest heights of heavens, is recorded in statements such as "visible from afar like the heavens with the stars," and "they who are born together self-luminous, with the spotted deer (the fluorescence), the spears (the pencil of rays), the daggers, the glittering ornaments."

The facts enumerated in these verses are all verified by our recent researches. The Maruts are often spoken of as producing rain. We know now that these rays ionize the gaseous particles and thus help condensation of moisture. It is this principle that is embodied in the statement that Gaṅga (water) is seated in the locks of Siva's hair.

We now proceed to lay before the reader our interpretation of the remaining *trichas*, on which the Âranyaka offers a commentary. The first verse of the fourth *tricha* is:—

ASWINA YAJVARIRISHO DRAVAT PANI SUBHASPATI  
PURUBHUJA CHANASYATAM.

*Padavibhāga* :—

Aswinau, yajvaririshâh, dravat, pâni, subhah, pati, puru,  
bhujâ, chana<sup>h</sup>, yatam.

Who are these Aswins ?

The word Aswinau is always used in the dual form, and denotes the twin-born physicians of the Hindu mythology. Of course, they are Devas, and hence they are either chemical or physical entities. There is a story connected with them, in which it is said that the Rishi Chyavana offered the *sôma* drink to these twins transgressing the usual custom of offering it to Indra. This necessarily leads us to assume that the Aswinau are physical entities of the nature of electricity. They are termed "Swarvaidyau", the physicians of heaven. The duty of a physician is to cure diseases and revive vitality and growth. Hence the Aswinau cure the diseases of the Devas (elements) and revive their vitality and growth, *i.e.*, bring about chemical changes, a purpose of Dharma. Consequently they are called "Nâsatyau", those who do not possess *adharma*. The term Aswinau informs us that they are always borne on horseback. We have explained that horse in the Vedic literature means a ray of light. When, therefore, it is said that they are always borne by horses, it is equivalent to saying that they are rays or what move in the form of rays. The word "Aswinîsutau", which is also a synonym of Aswinau, stands for the twin-born sons of Sanjñā, the wife of the sun, who conceived them while she had concealed herself in the form of a mare." Now, Sanjñā means "knowing much" or "that which enables us to know much." The horse which is here referred to is not an actual horse, but only "the form of a horse." It is therefore evident that it is some apparatus of the Vedic Physicists. Who that is acquainted with the phenomena of the discharge tube could hold that this apparatus which gives rise simultaneously to two kinds of visible rays, having electricity for their origin, is not the X-ray bulb. In the whole of our scientific literature

only the anode and kathode rays could be termed twin-born. The anode rays are specially designated by the denomination "Nâsatya", and the kathode rays by "Dasra". The introduction of the sun here in the capacity of being the father of these twins, is probably intended to give us the idea that they are being constantly produced in the sun, and are being projected into our atmosphere.

The Horse of the Aswamêda yajña designates the X-ray bulb, because when the latter is constructed on a large scale, it takes the shape of the head of a horse. In the sacred literature of the Hindus, it is also known as the Hayagrîva.

The verse given above identifies the Aswins with the rays of the discharge tube. It says that—

*The Aswins are flowing rays, owners of splendour, and endowed with many hands* \* (i. e., numerous rays.)

These properties of the Aswins have been experimentally verified by modern scientists.

The second verse of this *trîcha* is:

ASWINA PURUDAMSASA NARASAVIRAYA DHIYA DHISNYA-  
VANATAM GIRAH.

*Padavibhâga*:—

Aswinâ, pururdamsasâ, narâ, savirayâ, dhiyâ, dhishnya, avanatam, girah.

Purudamsasâ is a name of Indra. Nara is "the eternal, the divine imperishable spirit of the universe." This, according to the Vêdânta, is Indra (electricity.) Savirayâ qualifies Nara; it means "all-pervading," according to Sâyana. Avanatam should be translated by "are bent." Girah is the magnetic force (R. V. I, 1, 10.)

\* That the term hand is metaphorically used to represent rays may be inferred from terms such as sahasrakara and sahasrapâda, which designate the sun who sends forth innumerable rays.

Translation :—

*The Aswins are but the all-pervading Indra, the al ; they are bent by magnetic force.*

The new discoveries substantially state the same.

The third verse of this *tricha* is:

DASRA YUVAH KAVASUTA NASATYAVRITTA BARHISHA  
AYATAM RUDRAVARTANI.

*Padavibhāga* :—

Dasrā, yuvāh, kavasutā, nāsatya, āvritta, barhisha,  
āyātam, rudra, vartanī.

Translation :—

*The twin-born Dasra (the host of the kathode rays), is better than the other. From these rays which are reverted after striking the anode (nāsatya) come the Rudravartani (X-rays.)*

The expression Rudravartani means those which are of the nature of the *Rudras*. What are these *Rudras*? Elsewhere we had promised the reader the proof of the identity of the *Rudras* with the radiations emanating from active matter. We now proceed to establish this theory.

First of all it is necessary to show that the *Rudras* are radiations. There are some passages in the Vājasanêyi Samhita (XVI. 1ff., and 3, 57 ff.) which go to prove that they are of the character of rays. "Reverence, Rudra, to thy wrath, to thy arrow. Reverence to both thy arms. The arrow, O dweller in the mountains, which thou bearest in thy hand to discharge, make it O lord of the mountains auspicious ; do not slay men and cattle." Reverence to "you who discharge (the arrow), and to you who pierce, to you who sleep and wake,.....to the assemblies, and to you the lord of assemblies, to horses, and to you the lord of horses, to you the hosts which wound and pierce, which have excellent troops, and which are destructive." The arrows spoken of here are the rays.

The arms too are the rays. These rays slay men and animals. They pierce, *i.e.*, penetrate through matter. They are addressed as horses, hosts, etc. These properties have not been detected in anything save the radiations from radio-active substances, which, as we know, penetrate into matter and produce burns in animal bodies with painful irritation which lasts from ten to twenty days. There is therefore no inconsistency in addressing the Rudras as possessing wrath. Rudra is also called "Tryambaka," the Three-eyed one. The three eyes are the three different forms of radiation, namely, the *alpha*, *beta*, and *gamma* rays.

"We unbend a thousand leagues away the bows of those unnumbered thousands of Rudras who are upon earth. Above this great atmospheric ocean there exist Bhuvas. We unbend their bows a thousand leagues away. Rudras with blue necks and white throats occupy the sky. We unbend, etc. Sarvas with blue necks and white throats frequent (the regions) beneath the earth. We unbend, etc." These are the three kinds of rays issuing forth from the radio-active matter. This passage tells us that the Rudras are divided into three kinds, namely, Rudras proper, Bhuvas, and Sarvas. Rudras proper exist on the surface of the earth, Bhuvas beyond the atmosphere, and Sarvas in the atmosphere and underneath the surface of the earth. Modern research has revealed the fact that *gamma* rays are present everywhere on the surface of the earth, *alpha* rays in the atmosphere and underneath the surface of the earth, and *beta* rays beyond our atmosphere. That the *alpha* and *beta* rays are respectively the Sarvas and Bhuvas is evident from the remarks made in the Vedas, such as: "Let Bhuva and Sarva launch the lightning, the bolt of the gods, against the doer of wickedness, against him who employs sorcery, against

the evildoer." The Sarvas carry positive and the Bhuvras negative electrification, and the lightning is the result of the neutralization of these opposite kinds of electrification.

Recent researches have established the presence of these radiations in the atmosphere and under the surface crust of the earth. Physicists have found that "the activity obtained on a negatively charged wire exposed in the open air was found to be mainly due to *alpha* rays and to decay to half value in about 45 minutes," and that "a penetrating radiation of the *gamma* ray type is present everywhere on the surface of the earth." The presence of active matter in the higher regions of the atmosphere is recorded by Flemming, who, from balloon observations, "found that active matter was present in the air at an altitude of 3000 metres ..... At this height about the same amount was collected as at the surface of the earth. Saake and Gockel found that the amount of active matter collected at high altitudes was greater than at the sea level." That above this great atmospheric ocean there exist Bhuvras (*beta* rays) is evident from the following quotation: "The indirect evidence obtained from the study of aurora undoubtedly suggests that the sun emits rays similar in type to the *alpha* and *beta* rays. This would suggest the presence of considerable quantities of radio-active matter near the surface of the sun. So far no evidence has been obtained that a penetrating radiation corresponding to the *gamma* rays is emitted from the sun." Since there is no material obstruction between the sun's chromosphere and the surface of our atmosphere, there can be no contradiction to the statement that the space between, *i. e.*, the space beyond the atmosphere is filled mostly with these *beta* rays, inasmuch as the *alpha* particles lose their charge and give rise to Helium, thus losing the character of rays.

Again we read in the Vâjasanêyi Samhita thus :—" We deprecate from us the wrath of that auspicious deity who is copper-coloured, ruddy and brown and of those Rudras who in thousands surround him on all sides. May he who glides away, blue-necked, and red-coloured, and whom cowherds and female drawers of water have seen—may he when seen, be gracious to us." Surely, this deity is a visible one, and even uneducated and unscientific people such as cowherds and drawers of water could see him. He "dwells in pathways and roads, and hollows, and the skirts of mountains, and water courses, and lakes, and rivers, and ponds,..... in gravel and in streams (spring water), in stony ground and in habitable places." If to these statements we add that Sarvas "frequent (the regions) beneath the earth," and compare them with the modern ones, namely, that "the emanations of radium and thorium are everywhere present in the atmosphere near the surface of the earth," indicating "the wide spread existence of radio-active substances in the surface material of the earth," for a depth of "about 20 Kilometres" and that "the radium emanation is always present in matter, whether liquid or gaseous, which escapes from some depth of the earth's crust,"—we find that the two descriptions are very nearly coincident.

The radio-active matter is mostly obtained from rocks which, it need not be mentioned, form "the skirts of mountains." The gravel is the disintegrated rock, and, consequently, contains fine particles of certain minerals in which the radio-active matter occurs. The spring water that flows in the form of streams, passes through the surface crust of the earth dissolving many mineral salts as well as active matter. The fact that cowherds and drawers of water have seen the Rudras can be easily explained. The radiations are

ordinarily invisible ; but "a screen of Sidot's hexagonal blend (phosphorescent zinc sulphide) lights up brightly when exposed to *alpha* rays." The mineral waters that accumulate in some wells deposit this zinc sulphide, which they had dissolved while under pressure, on the bottom of the wells, and when *alpha* rays strike it, they produce phosphorescence which is noticed by those that draw water (generally females in india) and by cowherds who repair to the wells to obtain water for their cattle.

The Vâjasanêyi Samhita records the following medicinal properties of the radio-active matter. It says : "Thou art a medicine, a medicine for kine and horses, a medicine for men. ...." "May the intercessor, the first divine physician, intercede for us. Destroying all *serpents*, strike down and drive away all Yâtudhânas." These statements give us an idea that the Rudras have curative effects. Indeed, modern physiologists have admitted that "the use of radium rays has been found beneficial in certain diseases and 'Radium Institutes' have been founded in several countries for therapeutic purposes."

"Thou art gracious (*Siva*) by name ; a thunder-bolt (electric discharge) is thy father. Reverence be to thee : destroy us not..... I empower thee (experimenter) to obtain life, food to eat, the power of procreation, the possession of wealth, abundant offspring, and eminent prowess (by means of these Rudras)." These latter properties, which go to prove that these rays are the active principles that govern the evolution of organic from inorganic matter, have not been verified yet by modern scientists. It is in these that we should find an explanation of the use of the symbol "Linga" for denoting Rudra. The properties that



"they cross over to and fro," and that "they exist beyond and on this side," have but partly been verified by the moderners. We know that they pass from the world of energy into that of matter. But we do not know yet that they pass from the world of matter into that of energy.

A more direct proof than this theoretical reasoning of the statement that the Rudras are the radiations emanating from active matter, is embodied in one of the laudable customs of the Hindus. Even to this day we find among the Hindus the ancient custom of pilgrimage, which is a source of knowledge and health, but which unfortunately has received very little encouragement in modern days. People suffering from certain diseases were assured of cure if they made a pilgrimage to certain well-known places, and there partake of the clear mineral waters. These mineral waters are now known to contain radio-active matter, and it is this active matter that effects the cure. Even before the discovery of the radio-active matter, and consequently before knowing that the active matter dissolved in water had this curative property, afflicted people in the Western countries were in the habit of resorting to such mineral springs. But it cannot be argued from this premisis that the ancient Hindus, too, were ignorant of the physiological effects of active matter. If we carefully study the significance of Hindu customs, we would soon learn that the places of pilgrimage were created in ancient days with the full knowledge of the scientific truths connected with the radio-active matter. Thus we find that in all places where mineral springs containing active matter were detected, and it is mostly on hills or in hilly country, the ancients built a temple of Rudra with the symbol "Linga" in it, with a view to connote to the visitors the properties attributed to the Rudras in the statement: "I empower thee

to obtain life, food to eat, etc." Unlike the idols of other gods which are made of metals, the "Linga" of Rudra is invariably made out of special mineral rocks. This custom, transmitted through many a century, embodies the idea that the "Linga" stands for radio-active matter and its radiations. There are in fact certain "Lingas" which are so constructed as to afford us, without the use of any instruments, palpable evidence of active matter. Pilgrims who have visited Kānchi will easily understand this. There is there a temple with a big "Linga," about  $2\frac{1}{2}$  feet in height, called Chidambarnāth. This temple proposes to reveal the greatness and mystery surrounding Chidambar (Rudra.) It is so constructed that access to the "Linga" is only possible to the *purōhita* in charge. All visitors must be content with a look at the idol through a small aperture in front of it. The idol is not an ordinary one. It differs from the more recently inaugurated "Lingas" in that it emits a phosphorescent light over a circular area of about an inch diameter, and situated at a height of nearly 2 feet from the ground facing the aperture, thus serving to represent the third eye or the *phālanētra* of Rudra. The phosphorescence is visible at all times. It is not dependent on the position of the sun, nor on any arrangement of lenses. Hence all attempts to explain the phenomenon as an optical jugglery are futile. The only possible explanation is that in that area, a mixture of phosphorescent zinc sulphide and radio-active matter is by some means fixed into the "Linga".

We have sufficiently explained our position that the Rudras are physical agents of Nature. They are active rays. The term Rudravartani, therefore, means those which are similar to these radiations, especially the *gamma* type, because *gamma* rays have been specially designated by

the technical term Rudras. It is too well known that *gamma* rays resemble X-rays in many respects, such as, for instance, the photographic, electric or ionizing, and penetrating actions : hence we take Rudravartani to be the X-rays, and understand the verse to mean that from Dasra (the kathode rays) are the X-rays generated.

The next *tricha* deals with the *alpha* type of radiation. The *alpha* rays are here denominated Indrâyâhi (Indrâya and ahi). The term ahi which means serpent has been explained in the second chapter\* as representing radio-active radiations. We have the Purânic story referring to Rudra as wearing serpents. Rudra has been explained to be a term designating active matter. What but the radiations are worn by this active matter? In fact, the Sêshâhi (Sêsha and ahi) of the Purânas represents the gravitational force; it is that which holds the earth from falling and breaking to pieces.

Also, in the medical literature of the Hindus, lead is termed "Nâgasamjñika," i.e., that which is the sign or mark of the *nâgâs*. Compare this with the modern theory that lead is the end or final product of the disintegration of radio-active matter.

The expression ahi which occurs in this hymn does not mean iron, for which it has been taken in the first verse of the first *tricha*; but it here stands for a pencil of *alpha* rays inasmuch as it is here qualified by the expression Indrâya. Indrâyâhi, therefore, means active radiations which seek for Indra (atmospheric electricity), i.e., radiations which are sent forth by active matter and which are either attracted or repelled by electricity—a property of *alpha* rays.

The verse is as follows :—

INDRAYAHI CHITRABHANOH SUTA IMETWAYAVAT  
ANVIBHISTANA PUTASAH.

*Padavibhāga* :—

Indrāya, ahi, chitrabhânôh, sutâ, imê, tu, āya, vât,  
anvibhih, tanâ, pûtasah.

Indrâyâhi are here called the children of Chitrabhānu, the sun. Chitrabhānu is one who sends forth surprising rays. Emphasis is here laid upon the rays of the sun but not on its substance, so that by the term Chitrabhânôh sutâ we should understand the radio-active rays originating from the sun. Modern science admits that the sun gives off *alpha* rays as well as *beta* rays that are emitted by active matter. Scientists even believe that many elements that are not radio-active on this planet, are in a state of high activity in the sun. There is, therefore, no inconsistency in stating that *alpha* rays given out by radium and other active substances, are the children of the sun, inasmuch as they are to be found in the sun in much more abundance than on this planet. On the other hand it is the most natural procedure to so designate them.

Translation :—

*Indrâyâhi (the alpha rays), the children (radiations) of the sun, are obtained from this dwelling (in which the active matter is kept). These truthful (i.e., much used in experiments) ones spread out in the form of rays.*

The second verse of this *tricha* is :

INDRAYAHI DHİYOSHITSU VIPRAJATA SUTAVATAH  
UPABRAHMANAH VAGHATAH.

*Padavibhāga* :—

Indrāya, ahi, dhi, yôshitsu, vi, prajāta, sutāvatah,  
upabrahmānah, vâk, hatah.

Brahman is, according to the Hindu mythology, "the first deity of the Hindu triad, and the operative creator of the world". Therefore, Upabrahma is either his representative or the nearest to him. The expression is here applied to *alpha* rays; for the latter, although apparently immaterial, give rise to helium, and this is nearest to creation. Further, the expression is applied to *alpha* rays because the Veda declares that they are responsible for the evolution of organic matter from inorganic source.

Vák hata is that which dissipates electric charges. This is an established property of the radiations emanating from active matter, more pronouncedly of *alpha* rays, which ionize the gases surrounding the charge and thus produce its dissipation. This electric property of the radiations is of great importance, and has been utilized as the basis of a quantitative and qualitative examination of these radiations.

Translation :—

*Indrâyâhi* (i.e., the *alpha* rays), the *upabrahmânah*, which produce the dissipation of the electric charge, possesses the power of procreating children in women.

The third verse is :—

INDRAYAHI TUTUJANAH UPABRAHMANAH HARIVAH  
SUTE DADHISHVANASSANAI.

*Padavibhâga* :—

Indrâya, ahi, tu, tuja, nah, upabrahmânah, hari, vah,  
sutê, dadhishu, anah, sanaih.

Harivah designates the *alpha* ray inasmuch as it embodies *hari* which is a synonym of helium. Literally it means the dwelling of the sun. But the sun here stands for helium. Hence it signifies the *alpha* ray, which is but the charged helium atom.

Translation :—

*Indeed, the above referred Indrâyâhi* (the *alpha* rays),

*the upabrahmánah, the abode of helium, give us offspring. They slowly endow the embryo with life.*

It is desirable to recount here what we have already cited from the Vājasanêyi Samhita; viz., "I empower thee to obtain life, food to eat, the power of procreation, etc. (by the use of these Rudras)." This is what is contained in these Riks. Although sceptics may fail to share in this belief, nevertheless, it is but just to record what these Riks declare. In this connection there is a Brâhmanah text which has been translated thus: "That this mantra is that one which has been seen by Sarparâjñi (the earth) because the earth is the queen of the Serpents (the radiations), as she is the mother of all that moves (sarpat). In the beginning she (the earth) was but one head (round), without hair (bald), i.e., without vegetation. She then perceived this mantra which confers upon him who knows it, the power of assuming any form which he might desire....." This supports the view expressed in the above verses, and affords us the most needed link connecting the animate and inanimate forms of existence, which has hitherto eluded the vigilance of the scientist and baffled his attempt to fathom the source of life.

Compare the theme of this *trichat* with the ideas of some of the ancients other than the Hindus. We here reproduce a quotation which gives us the opinion of the ancient Greeks. It runs thus: "Aristotle maintains that the gas or *emanation*, escaping from inside the earth, is the sole sufficient cause, acting from within outwardly for the vivification of every living being and plant upon the external crust. In answer to the sceptical negators of his century, Cicero, moved by just wrath, exclaims: 'And what can be more divine than the exhalations of the earth, which affect the human soul so as to enable her to predict the future? And could the

hand of time evaporate such a virtue? Do you suppose you are talking of some kind of wine or salted meat?'" The gas or emanation of Aristotle, and the exhalations of earth of Cicero, are the radio-active emanations that emanate from active matter which is found everywhere under the surface crust of the earth. When the pressure on the surface of the earth becomes considerably diminished, these emanations that are imprisoned within the surface crust of the earth, escape into the atmosphere "from inside the earth". The sentence "And could the hand of time evaporate such a virtue" is full of portent. The emanations continue to emanate from active substances so long as the latter do not cease to exist on this planet, and there is not the slightest chance that before the sun becomes extinct the radio-active matter would vanish from this earth. It is clear that the ancients, whether Asiatic or European, believed that all life on this planet is due to radio-active matter.

A celebrated Orientalist cites the story of the Aswamêdha yajña performed for obtaining children by those barren women who are suffering from "*Nâgârishta dôsha*" (menstrual disorder of a particular nature), and laughs at its supposed savagery. It is enacted therein that having prepared the *Horse* in accordance with the prescribed rites, the lady who is desirous of children should spend three nights in actual cohabitation with him. What is actually meant by the horse prepared according to the prescribed rites is the X-ray bulb, and his generative organ may not be other than a tubular projection through which X-rays issue forth. For sooth, here is the thread connecting life and matter.

This grand principle of Nature, dealing with the manifes-

tation of animate matter in the course of evolution, is still to be found incorporated in one of the ancient customs of the people of India. Historians record the worship of *Nāgās* which was prevalent in the "prehistoric" times, and remark with their characteristic ignorance of the esoteric significance of Hindu customs, that it was a mean and barbarous idolatry. Little do they understand that the custom has resulted from advanced scientific knowledge. Even to this day, the fourth day of the month of *śrāvana* of every year, is dedicated to the worship of *Nāgās*, when the newly married couple of a Hindu family, are made to observe this custom, although its significance has long been forgotten.

The term *Indrāyāhi* is pregnant with meaning. We have taken it to denote the *ahi* (radiations) seeking for Indra (electricity). This is a fact borne out by experiment. When a negatively charged wire is kept for some time in a atmosphere of the emanation from active matter, or for the matter of that even in air, we find a thin film of active matter deposited on it. Evidently, the electric charge on the wire attracts the active matter, or conversely, the active matter seeks for the electric charge. It is this phenomenon that would explain some of the experiments made with respect to the growth of plants. The records on this subject prove that the plot electrified by a charged overhead net-work of fine wires, "showed the remarkable increase of 30% in grain and 58% in straw as the presumptive effect of the discharge which is applied on the average five hours daily for 108 days. The crops were not heavy but the superiority of the crop on the electrified plot was marked from the earliest stages of growth, and it suffered less from the dryness of the season" (Nature Nov. 23. 1916.) A still later experiment, in which a much greater intensity of



discharge was reached by lowering and closing together the charged wires, revealed that "the electrified area showed the astonishing increase of 49% in grain and 88% in straw. It was further observed that the electrification had a marked '*after effect*', the clover crop, which succeeded the oats in the electrified area, being much better than that in the rest of the field." This clearly establishes the relation between the electrical energy and plant growth. The presence of an overhead metallic net-work that is electrified, has a well marked stimulating effect on the growth of plants. In other words it gives more activity and vitality (life) to the plant. Although admittedly nothing definite is yet known about the mechanism of the action of electricity on crops, still two assumptions have been made to explain the phenomenon. Some believe that the current passes from the overhead metallic wires to the earth through the body of the plant, while others, regarding this current as too feeble to produce the observed effects, attribute them to the intensity of the electric field in which the plant finds itself, and which "stimulates the discharge of electricity into the air from the spicules, edges, and hairs of the plant-body." But in the light of what has been said in connection with the fifth *tricha*, it is but easy to infer that the latter explanation is nearest the truth. The electrified net-work attracts or draws the active emanations to the surface of the earth from under its surface crust, and concentrates them over the electrified plot of land: it is these emanations or the charged particles issuing from the active matter deposited by these emanations that give the plants the noticed increase of vitality. Of course, ordinarily, the atmosphere contains this emanation in small quantities and consequently we obtain an average crop. But within the charged net-work there will be a greater

percentage of this emanation, and this will explain the observed results. During the whole process, active matter is deposited on the area of the plot, and this will act on the clover crop which succeeds the main one increasing its vitality. It appears that this is the correct view inasmuch as the "after effect" on the clover crop, takes place although the overhead metallic wires are now uncharged. Research students may profitably make some experiments to test the validity of this hypothesis which is exclusively based on the authority of the Vedas.

The sixth *tricha* deals with the chemistry of the preparation of the Visvêdêvas. The term Visvêdêvas is derived from the root Vis, to enter or pervade. We have the text : "Srâddhâgrê visantiti Visvê", which means that the Visvêdêvas are those that enter in the forefront of a carefully performed experiment. They form the stem of this organic manifestation. They therefore must be of the nature of elementary organic substances. In fact, the procedure given in the Vedas for their preparation, identifies them with the aldehydes. They are the oxidation products of the alcohols.

The first verse of this *tricha* is as follows :—

OMASASCHARSHANI DHRITO VISVEDEVASA AGATA  
DASVAMSO DASUSHASSUTAM.

*Padavibhâga* :—

Ôm, âsah, charshanî, dhritah, visvêdêvâsah, âgata,  
dâsva, amsah, dâsushah, sutam.

What is the significance of the monosyllable Ôm ? We give here a few verses from the Upanishads which explain the real meaning of the term.

"That syllable is a syllable of permission, for whenever we permit anything, we say Ôm, yes. Now permission is gratification. He who knowing this meditates on the syllable

(Ôm), the Udgîtha, becomes indeed a gratifier of desires.

"By that syllable does the three-fold knowledge (the sacrifice *i.e.*, the experiment more particularly the sôma experiment, as founded on the three Vedas) proceed. When the Adhvaryu priest gives an order, he says Ôm. When the Hôtri priest recites, he says Ôm. When the Udgâtri priest sings, he says Ôm,—all for the glory of that syllable.

"Now therefore it would seem to follow, that both he who knows this (the true meaning of the syllable Ôm), and he who does not, perform the same experiment. But that is not so, for knowledge and ignorance are different. The experiment which a man performs with knowledge, faith, and the Upanishad is more powerful (because it gives practical results). This is the full account of the syllable Ôm." (Chândôgya Upanishad I.I.8-10, translated by Max Müller.)

From these passages, it is evident that Ôm is used in the Vedas as a symbol of permission to perform the experiments with organic substances more especially with alcohols.

It has already been remarked that sutam is the acid aqueous distillate obtained by the experiment known to the Vedic Scientists as the "Sômâbhishavam." In this experiment Sami wood is subjected to destructive distillation. Generally when wood is treated in this way, it yields inflammable gases, a quantity of tar, and a strongly acid aqueous distillate. This aqueous extract contains methyl alcohol mixed with acetic acid and acetone and a little methylacetate. We have seen that the Vedic Scientists used to obtain hydrogen from the acetic acid of this sôma by replacement by iron. In this *tricha* is given a method to oxidize the methyl alcohol of this sutam for obtaining one of the Visvêdêvas, namely, formaldehyde.

The Âranyaka comments on the word dâsusha, and

instructs us to understand by the term oxygen, and to take two volumes of oxygen and one of the suta juice.

Translation :

*Let two men shake strongly (a mixture of) methyl alcohol and a liberal portion of oxygen for the production of the Visvêdêva (formaldehyde).*

This experiment is further explained in the succeeding Rik, which reads thus:—

VISVEDEVASO APSURAH SUTAMAGANTA TURNAYAH  
USRAIVA SVASARANI.

*Padavibhâga :—*

Visvêdêvâsah, apsu, rah, sutam, âganta, tûrnayah, usrâ, iva, sva, sara, âni.

That the substance (dâsusha) used along with the alcohol is oxygen, is set forth in the expression “apsurah,” which means “the Agni or oxygen in the water.” Tûrnayah is the plural form of tûrni. The latter is translated by Wilson by “dirt or excrement.” Here it means that which is thrown out from the mixture of oxygen and alcohol on shaking. Note that the expression *udadhi mala*, the excrement of the ocean, is a name of the froth generated when the waves of the sea strike the coast—“*phênâm*.” Tûrni is the name of such froth generated when oxygen and alcohol are strongly shaken, as directed in the previous Rik. This froth is necessarily, therefore, fully saturated with oxygen and contains the vapours of alcohol as well.

Translation :—

*Visvêdêvas are obtained from oxygen and alcohol which give rise on shaking to froth rich in oxygen and vapours of alcohol, similar to the froth obtained on the surface of a cow's freshly milked milk.*

In the succeeding verse we are directed to cool the mixture in ice, in order to obtain the Visvêdêvas. The verse runs thus :—

VISVEDEVASO ASRITA EHIMAYASO ADRUHE MEGHAM  
JUSHANTA VAHNAYAH.

*Padavibhâga* :—

Visvêdêvâsah, âsrita, ê, hima, âyâsah, adruha, mêgham, jushanta, vahnayah.

Adruha is a compound of a and druha, and qualifies Visvêdêvas. Druha means an injurer or one who hurts. The "a" gives it a negative meaning so that adruha means that which does not injure, or it may even be taken to mean that which does good. We know that formaldehyde is of great service to us not only technically but also from a sanitary point of view. Âsrita is translated by Wilson by "taking one's station at or on, as at a window or a seat, etc." It is here used along with hima and consequently means taking seat in hima, *i.e.*, in snow or ice. The purport is that the mixture is kept in ice to be cooled. Vahnayah is the plural form of Vahni, which is a name of Agni (oxygen).

The phrase Mêgham jushanta vahnayah means "the oxygen that combines with the mêgham." Mêgham therefore refers to the alcohol. That this is so becomes evident if we consider the Purânic story of Vritra—with which the term mêgham is synonymous—being killed by Indra (electric current). In the next *tricha* we are informed that the electric current brings about the reaction between oxygen and alcohol, *i.e.*, Indra kills Vritra. The story goes on to say that Indra's *vajrâyudha* (the electric current), to which a coating of foam or froth has been previously applied, brings about the death of Vritra, that is, the change of methyl alcohol into formaldehyde. The foam is the *tûrnayah* of the previous

verse which is saturated with oxygen and vapours of alcohol.

Translation :—

*The beneficent Visvêdêvas are obtained in solution by cooling the mixture in ice. The oxygen acts on the alcohol.*

The succeeding *tricha*, too, deals with the same subject. Its first verse is :—

PAVAKANAH SARASWATI VAJEBHIR VAJINIVATI YAJNAM-  
VASTU DHIYAVASU.

*Padavibhâga* :—

Pāvaka, anah, saraswati, vâjêbhir, vâjinîvati, yajñam, vastu, dhiyâvasu.

The Âranyaka says that dhiyâvasu is Vâk, electricity, and that yajñamvastu means to make the experiment. Pāvaka, i.e., Agni, is that which we breathe (anah), namely, oxygen. Saraswati is an imperceptible form of sa+rasa+vat, and denotes the alcohol of the suta. Vâja means "the acidulous mixture of ground meal and water left to ferment," so that by vâjêbhirvâjinîvati we must understand the alcohol in the acid sôma extracted from the Samî wood.

Translation :—

*The Pāvaka used is that which we breathe, namely, oxygen. The liquid used is the alcohol of the aqueous distillate from the Sami wood. A current of electricity (through a wire suspended in the froth or foam) brings about the reaction.*

The last verse of this *tricha* is as follows :—

MAHOARNAH SARASWATI PRACHETAYATI KETUNA  
DHIYO VISVA VIRAJATI.

*Padavibhâga* :—

Mahah, arnah, saraswati, prachêtayati, kêtunâ, dhiyah, visva, virâjati.

Translation :—

*By the mark or designation " mahôarnah " (the ocean, with the foam from which the Vajráyudha of Indra was coated—Purânic story of Indra killing Vritra), one infers this very saraswati (alcohol), and by dhiyâ that which shines universally (electric current).*

We proceed to show that the Vritra which figures so prominently in the Vedas and the Purânas, is a term applied by the Vedic Chemists to designate alcohol. In the first hymn addressed to Indra, the ordinary process of distillation for obtaining alcohol from fermented rice is recorded. The Rik reads thus :—

EMASUMASAVAMBHARA YAJNASRIYAM NRIMADANAM  
PATAYAN MANDAYATSAKHAM.

*Padavibhâga :—*

Â, imâ, âsum, âsavam, bhara, yajñasriyam, nrimâdanam,  
patayat, mandayat, sakham.

This verse contains the usual process of distillation of fermented rice for preparing alcohol. Âsum is " rice ripening in the rainy season ". Âsavam is " a spirit distilled from molasses ". Yajñasriyam is compounded of yajña and sriyam. The former coming from the root yaj, to experiment, means experimenting, while the latter being derived from sri, to cook, conveys the meaning of distillation. The compound yajña-sriyam, therefore, means the act of distillation.

Translation :—

*By distilling a great quantity of (fermented) rice, alcohol, which intoxicates men, distils over.*

Alcohol is here further qualified as inebriating friends, thus showing that it is that variety which is drunk. This, of course, is one of the modern methods of preparing alcohol for purposes of human consumption.

The next verse reads thus:—

ASYA PITVOH SATAKRATO GHANO VRITRANAMABHAVAH  
PRAVO VAJESHU VAJINAM.

*Padavibhāga* :—

Asya, pîtvoḥ, satakratô, ghanah, vritrânâm, abhavah,  
prāvah, vâjêshu, vâjinam.

Translation :—

*Indra! you (bring about) the transformation of the  
Vritras, the mēghas of this (alcohol), and of oxygen. You  
burn the alcohol (which is produced) in fermented liquids.*

Note that the word ghanah is a synonym of mēgha which  
occurred in the last verse of the sixth *trichā*. The word Vritra  
is also a synonym of mēgha. Hence ghana is a synonym of  
Vritra, the Demon of the inventive imagination of our Vedic  
scholar. The two terms signify only alcohol.

The next verse is :

TAM TWA VAJESHU VAJINAM VAJAYAMAH SATAKRATO  
DHANANAM INDRA SATAYE.

*Padavibhāga* :—

Tam, twâ, vâjêshu, vâjinam, vâjayâmah, satakratô,  
dhanânâm, indra, sâtayê.

Translation :—

*O Indra! for obtaining the best of wealth, we prepare  
(and experiment with) oxygen, alcohol of fermented liquids, and  
you.*

These six verses clearly establish that Vritra is the  
name given to alcohol, and the story of Vritra being  
killed by Indra refers to the transformation of alcohols  
into aldehydes.

The experiment in modern terminology would run  
thus :—



Take a quantity of methyl alcohol extracted by the dry distillation of wood, and an excess of oxygen in a conical flask fitted with a cork, and shake them thoroughly so as to form a thick foamy layer on the top of the liquid. Cool the mixture in ice in order that the resulting froth may be stable. Remove the cork, and heat the foamy layer with an incandescent circular spiral of platinum wire, of about  $\frac{3}{4}$  the diameter of the flask, through which a current of electricity passes. The foam contains the vapours of methyl alcohol as well as oxygen, and under the influence of the glowing metallic spiral, formaldehyde is formed which is dissolved in the cold alcoholic solution.

In order to enable the reader to judge how nearly identical this method of preparing formaldehyde is with the modern one, we briefly give here the modern experiment. We take a quantity of methyl alcohol in a beaker, and adjust a horizontal spiral of platinum wire whose other end is fixed to a horizontal glass rod suspended across the neck of the beaker, so that it is just above the surface of the liquid in the beaker. If now we remove the platinum spiral from the beaker, and heat it red hot and then introduce it again into the beaker, we get the acrid smell of formaldehyde. The platinum spiral will continue to glow, evolving formaldehyde. The oxidation takes place by means of the oxygen in the air, which is occluded, or absorbed by the platinum and is then supposed to be in a much more active condition than free oxygen.

Here ends the seven *trichas* with respect to each of which the *Âranyaka* has something to say. This could not have been the case, if these *Riks* did not really embody the most outstanding principles of science as known to the Vedic *Rishis*. These verses deal with the processes of preparing

some of the chemical elements and reagents, and speak of the properties of physical entities such as the anode and kathode rays, and radiations from active matter. But it may be urged that, since in these seven *trichas* nothing is mentioned about the most useful element oxygen and the indispensable physical entity electricity, we need not suppose that the *Âranyaka* did comment on these verses with the knowing that they contained principles of science : as such, its directions are of no moment, and cannot speak of the facts of science. This argument, however, is refuted by the *Âranyaka* itself when, a little further on, it says that "the verses contained in these seven *trichas* are twenty-one in number, and by adding two more at the beginning and two at the end, thus making the first and the last verses three, we will obtain twenty-five, the full body of *Prajâpati*." This would then be found to include the last two verses from the hymn addressed to *Agni* and the first two from that addressed to *Indra*, which, as has already been shown, give us the methods of preparing oxygen and electricity.

The scope of this little tract does not permit us to record here a complete interpretation of the *Veda*. Our purpose is to show to our readers that the *Vedas* are scientific treatises. We feel that the interpretation given here of the first seven *vargas* of the *Rig Veda*, does more than serve our purpose.

This, however, is not all. Common sense would not permit us to throw the *Vedas* into oblivion. The first step in the misunderstanding of the *Vedas* is the short-sighted remark that the language found in them is primitive, which must needs imply an undeveloped state of mind of its authors. The facts in favour of this postulation are the supposed quaintness of the words used in them, the so-called transition in meaning

of and want of meaning for certain words, the failure to find some of these words in the literature of later growth, and such other meshy arguments. The words appear to be queer only because either the *padavibhāga* is improperly made, or else a meaning unknown to the lexicographers and other writers is read into them with a view to obtain an interpretation after their own minds. The natural sense, the meaning arrived at through a consideration of the derivative meaning, of most of the words, is rarely accepted by the many commentators and scholars. For instance, the first part of the simple Gâyatrî verse *Ômasascharshanî dhritô visvêdêvâsa âgata dâsvâmsô dâsushassutam*, has been translated by "O Visvêdêvas! who are bestowers of shelter, protectors of men, come hither". The *Padavibhāga* is made thus: *Ômâsah, charshanî, dhritô, Visvêdêvâsah, âgata*, etc. With the exception of the first word the *Padavibhāga* is quite correct: *Ôm, âsah*, are the two words compounded to form *Ômâsah*. The neglect of this very slight grammatical requisition has wholly upset the meaning of the verse.

The words that seem to have no meaning are either technical words or corrupted ones. The meaning, however, can be obtained from the root of the word and the context. Since the Vedas are scientific treatises, and as they are written according to a very strict scientific system, which is the more rigid and scientific because it was intended to be capable of being understood at such times as the present one, when no trace of their real significance could be detected, it is but meet that their composers should use words that should not and could not be used with any advantage by literary writers of latter times. Think of one of the modern books on an advanced scientific subject. It would be a matter of little wonder that a man in the streets of some small

aboriginal village in the deserts of Africa, should, by chance, find himself in the demolished streets of London, which, let us suppose, had been subjected to a continuous degradation for over five thousand years from hence, during which time the unscrupulous foreign oppressors, assisted by the consequent superstition, ignorance, and helplessness of the inhabitants, had heedlessly demolished the whole of the English literature, both profane and sacred, *i.e.*, scientific, and having picked up some English from the then proficient English scholars, should tumble over a book treating of one of these advanced subjects, and laugh at it calling the present inhabitants of the British Isles so many names—primitive, childish, silly, and hideous. But the wonder is that the Vedas have come down to us more or less intact, and that eventually we have been able to decipher them. Are these then the thoughts of primitive minds?

What is the significance of the statement that the Vedas are *anantam*, endless? No sane person can hold that the *Rishis* sang a few songs in praise of a few superstitious deities and declared that they were endless. How would it be if it is taken to mean that the Laws of Nature are endless?

That even now, notwithstanding the much boasted fitness and equipment of our investigators, we have still a number of doubts—important doubts—requiring solution, points out to the unstable foundation on which the customary interpretation of the Vedic texts is based. Why should there be in the Vedas, if they are really the works of ignorant and superstitious aborigines, certain outstanding ideas which are decidedly modern and completely scientific as is widely admitted? Would you say that “things hid from the wise and prudent have sometimes been revealed to the babes?” That all higher knowledge presupposes the prevalence of the lower kind, and

that all induction is a result of scientific classification cannot be gainsaid. To say that the Rishis, though primitive in action and thought, could think and argue about the subject of "the science of sciences," the Âtmavichâra, is, verily, to say that a man, though born blind, could correctly describe the various colours, shades, and decoration of an artistic production held before his sightless eyes.

It is, therefore, evident that the Vedas cannot be other than the aggregation of systematized scientific facts and principles, with the concomitant theories of our existence. We cannot call them the grotesque demonstrations of barbaric intellect, nor the productions of "childish age of human mind." Yet, a doubt lags behind. Why should these Rishis who had all the principles of Nature at their finger ends lose ground, and give place to this detestable progeny who know not their own pedigree, and their own strength? It is quite pertinent to ask why that science which once flourished with superabundant splendour perished without the least trace of life. The reasons are similar to those that are put forth to questions such as, why did Rome perish, why Babylone, why the extinction of stars and the projection of new ones to take their place be occasioned in this all sufficient manifestation.

The answer lies in the very philosophy of existence. It goes unchallenged that a body in perpetual wave-motion, such as an ideal pendulum, has its ups and downs, reaching now the summit, now the bottom, and lo! the top again. This is the nature of our existence. We are, all things are, in perpetual motion. Unlike the modern evolutionists of the West, who are positively unanimous in affirming to the contrary with their present insufficient knowledge of the Laws of Nature which invariably leads them to a misunder-

standing of the unnoticeable inner workings of Nature manifesting at times few and far between, the ancient Rishis who had complete knowledge of the Universe, its whence, why, and whereto, declared that all individual and aggregate material existence worth the name, is bound up by progression and retrogression, the result of the eternal Duality, and in fact, the irrevocable principle of action and reaction. There is "a natural law pertaining to civilization analogous to the law of organic nature; namely, that growth results in maturity, maturity in degeneracy, and degeneracy in disintegration—in other words the law of human cycles." On their way towards the attainment of a secondless civilization, nations gather and store up potential energy in the form of knowledge by the seeming expenditure of kinetic energy in the form of *tapas*. A nation's very condition of being at the summit of civilization, is the source and beginning of the process of decay which eventually leaves it on the lowest step. This requires no elaborate proof. The pride, the luxurious indolence with the consequent lack of faith and interest on the lower plane, and the spirit of renunciation, retirement, and especially *Sanyāsam* on the higher plane—all these taking their origin in that civilization which results from the possession of abundant riches and complete knowledge, in short the *advaita* stage—are the direct causes of the downward march in complete accord with the saying that

"The old order changeth, yielding place to new  
And God fulfils himself in many ways,  
Lest one good custom should corrupt the world."

But there are some amongst us who "cannot so interpret the history of mankind. Our present civilization," they say, "is built upon a radically different foundation from that of any of the nations whose history may be cited as a precedent.

The difference may be illustrated by a single reference. Taking Greece as an example presenting the most striking contrast between the highest degree of her enlightenment and the lowest degree of her degeneracy, the most obvious fact pertaining to the character of her civilization is this: that in not one of the arts and sciences in which she excelled the most barbarous nations which surrounded her was there a single element of power that could give promise of national perpetuity, or even of substantial national progress. The Greeks excelled in philosophy, but it was almost purely speculative, and was therefore subject to the law of reaction. Their science was as speculative as their philosophy, and subject to the same law. They excelled in mathematics, but in the absence of other sciences, of which mathematics is but the handmaiden, it was not an element of power. They excelled in art and literature but in neither was there an element of national strength; for though the art of Phidias has never been surpassed, and Homer's rank after the lapse of ages is unchallenged, the sculptor's chisel and the poet's tablet were poor weapons of defence against the superior physical force of their enemies.

“ On the other hand, the civilization of the present day is founded upon the inductive sciences. In the inductive sciences the law is that of eternal progress. In them there is no possible element of reaction. A proposition or principle of natural philosophy, once established, is as firmly fixed as a proposition in mathematics, and is never afterwards disputed. Every step, therefore, is a step in advance. Every new demonstration of a Law of Nature furnishes the basis for a fresh start in a thousand different directions. There is, therefore, no possibility that, either in the purely demonstrative or in the purely experimental sciences, the world can

ever again go backward, and there is as little probability that it will ever stand still.\*

Orientalists will easily recognize the fallacy of this argument. Evidently, the author of these statements shrewdly ignores the case of India. With all her *astras* and *sastras*, the weapons of offence and defence, and with all her unequalled heroes and heroines, the ancient majestic India had to patiently acquiesce in her dethronement from the pre-eminent position of inspirer of nations, dispenser of justice, and bestower of knowledge. The hypothesis enunciated by the learned writer, appears to be the result of a mistaking of the perpetual motion of the universe for the evolutionary process. Advancement and development are invariably succeeded by degradation and disintegration, and *vice versa*. That there cannot be an eternal progress for man is evident from the facts that man, *as long as he is a man*, cannot but fail to pass beyond a certain stage in the acquisition of knowledge, and that he cannot train himself to possess unqualified almighty power: further, there is little chance that he would change from man to something else, since he is directly controlled by the sun, the radio-active radiations, and the electric energy whose conditions are happily stable, and from whom comes the energy that begets and nourishes both his body and mind. We may analyse Nature to its first principles, we may create a new and well-peopled world, yet we will be lacking in knowledge, for knowledge is infinite and whatever we can achieve is but finite. Even the Siddhas of ancient Bharatavarsha, who were fully acquainted with Nature's workings, were unable to save us this catastrophic degradation.

There is no way of refuting the assumption so easily put

\* Dr. Hudson's "A Scientific Demonstration of the Future Life."



forth by the votaries of "eternal progress," who do not concede that India had in bygone days attained a civilization far ahead of the present one, save by a philosophic consideration of the purpose of the dynamical laws of Nature. The first law of motion expressing that a body in a state of motion or of rest continues to be in the same state until a new force acts on it, when applied to this manifestation in its entirety establishes its perpetual motion. The universe is a set of phenomena wrought under the influence of a system of forces. Differences and alterations in these phenomena bring the forces of Nature into play; the consequent readjustment produces a new set of phenomena partly differing from the first. This is what is happening in Nature day and night—successive adjustments to new environments. There is thus a constant change of phenomena, resulting in a perpetual motion in which the whole universe is constantly changing its form. Indeed, this dynamical law is the basis on which rests the philosophical idea of the Hindu respecting the reality and continuity of manifestation.

The beauty of this incessant universal change is that it embodies an invariant continuousness; for if the continuousness of universal motion be subject to variation, then we shall have to accept the scientifically indefensible position that the universal motion will eventually reach a stand-still. This invariant continuousness is but the harmonic or cyclic motion, which naturally, therefore, underlies all the activities of Nature: necessarily it must also govern human progress. Just as in a wave-motion a crest is invariably followed by a hollow, and *vice versa*, the processes of progression and retrogression mark time to the procession of events. Human societies cannot, in consequence, be eternally progressing, but must needs retrace their steps backwards after reaching the zenith of possible human endeavour and achievement.

Laws of Nature are due neither to chance nor human invention, but each of them, however trivial, is indispensable in the act of manifestation. The second law of motion stating that the motion of a body is in the direction of the force applied (which may be positive or negative), and that the rate of change of motion is proportional directly to the force acting and inversely to the mass of the body, establishes, when applied in the case of humanity, that the latter is subject to the dual processes of forward and backward movements. Of course, there is the humanity in perpetual motion. Its inertia or what corresponds to the mass of a body, is the ignorance in which it is steeped. The forces leading it forward are *Bhakti* and *Sraddha*, i.e., faith and direct interest, which guide the *Rishis* in the acquisition of knowledge. When these forces are on the ascendancy as they are in the present epoch, the transition from decadence and ignorance to prosperity and enlightenment becomes a matter of certainty and ease. But when they are in the reverse direction, degeneration is the invariable result.

Loss of faith and interest in the acquisition of knowledge, which results in a society at the zenith of civilization, curtails the amount of knowledge possessed by an individual or a community. In the *Mahābhārata* it is said that "this diminution in the amount of knowledge shortens the duration of man's life, which in its turn seriously interferes with the study of known sciences. In the train of this little knowledge follow successively illusion, cupidity, desire, wrath, enmity, etc." This is the course which humanity had taken ever since the exit of *Krishna* and the warrior scientists of the *Dwāpara Yuga*. But fortunately for us we are now traversing on the wave towards the crest of human progress.

In his "The Scientific Basis of Morality," Dr. G. Gore

expresses himself thus on this subject of universal wave-motion. "Nearly all periodical changes in Nature have been likened to rhythmic action and wave-motion; thus there are the extremely minute waves of light and radiant heat, the larger ones of electro-magnetism, the still larger waves of sound, the rhythmic actions of the heart and lungs, the visible waves on the surface of water, the much larger waves called "the tides," the sinuous or wave-like motion of the planets in their orbits, the rise and fall of temperature in summer and winter, the alternate states of sleeping and waking, the rise and fall of individuals, firms, families, tribes, and nations, the pendulum-like changes of Government from Conservative to Liberal, and the reverse, etc. 'Civilization is an ebb and flow' (Macaulay). Nature's poetry is vibration, wave-motion, rhythm, and harmony, and we all reverence, worship, and admire it; and human music and poetry are of a similar character.

"A careful study of our own functions will show that we do nothing without some relation to exact periods of action. We not only hunger and desire sleep, and wake at regular intervals, but the circulation and respiration, and all unconscious functions, obey established rhythmic times. Passing into society we are discovered to be under such laws of periodicity that we have rhythmic social beats of pessimism and optimism. Financial expansion and contraction with crises which come about with regularity' (The Open Court, 165, p. 2582). 'When matters are at their worst they begin to mend,' because the deepest depression of the wave of adversity has passed. Rhythmic action is universal, and, as far as we can infer, eternal. As there are 'wheels within wheels,' so are there waves superimposed upon each other; thus a man or a nation may be rising in wealth whilst declining in morality; families

are rising and falling in prosperity, largely independent of the state of the nation. As civilisation progresses, the amplitude of its wave appears to diminish, probably because the difference between nations grows less, their conflict smaller, the contrast between ignorance and intelligence less. In an imaginary millennium, as in an ideal immortality there would be no decline or decay, and therefore no rise or fall of condition; *the possibility of perfectly uniform happiness, either in the form of a millennium or of immortality, is, however, a very unscientific assumption.*"

Thus it was that though the Rishis and their co-inhabitants of this planet of the Golden Age, had drunk the sweet honey of the fruit of Dharma to their heart's content, yet, they could not preserve that fruit for the enjoyment of their progeny. But, however, perceiving this inevitable course of events, they did a great boon to humanity by preserving the seeds of the fruit to be sown whenever required. They hid the seeds, lest they should get worm-eaten, in the best steel chest procurable, and erected a strong double-fortification around it. Neither the forts nor the chest had an opening. The keys to open them have ever been *Sraddha* and *Bhakti*, and the key to the seed is *Tapas* and nothing but *Tapas*.

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## CHAPTER V.

### EVIDENCE FROM THE VEDANTA AND OTHER BRANCHES OF PHILOSOPHY.

**T**HE Vêdânta and other branches of philosophy—What they teach—How some of the salient features of the Vêdânta have been misunderstood—The theories advocated by the Vêdântins have been developed from scientific premises—The doctrine of *Mâyâ*—Its identity with the electron theory of matter—The four *Âsramas*.

In this chapter we propose to establish that the principle concepts of the Vêdânta and other branches of philosophy which have originated from the Veda, are the logical sequence of the study of Natural Law ; and that, therefore, the Veda is the embodiment of scientific facts and principles. The Veda, around which our national life is centred, is the bed-rock of our Heritage. It is the beginning and end of all that we own. Sprouting in the distant glories of Bharatavarsha from her wide-awake consciousness, it has developed and fostered the all-embracing ideal of self-realization, which is sometimes designated as the percipience of Unity in Diversity. Out of this Veda, which contains the basic Truths relating to the three phases of Nature, the Satwa (psychic force), Rajas (physical force), and Tamas (matter with inertia), has emanated that knowledge which leads us beyond the phenomenal Universe, and which at the same time includes and transcends the Satwa, the best of the three phases. It could not have been better designated than by the term Vêdânta which means

the end of the Veda, whether we take it in the sense of an integral though only the final portion, or the final object, of the Veda. The Vêdānta, as Max Müller observes, is "at the same time the most sublime philosophy and the most satisfying religion ;"\* and together with the other branches of philosophy it has been rightly believed by the Hindus to belong to *Smṛiti* rather than to *Sruti* or revealed scripture. The five other so-called "systems of philosophy" are but mere introductions† to this most essential Science of Self. The jurisdiction of the Pūrva Mīmāṃsa extends so far as to explain the real nature and importance of the Veda and the experiments recorded in it, and to lead up to the Nyāya and Vaisêshika *darsanas* which prepare us for the correct understanding of the Sāmkhya. Sāmkhya is the name applied to the theory from which the practices of the Yôga philosophy are derived. The realization of Self, it is said, can be effected by conforming to the teachings of the Sāmkhya accompanied by the practice of the Yôga. These two branches are respectively the left and right hands of the Vêdānta.

The Pūrva Mīmāṃsa, Nyāya and Vaisêshika promulgate the "Ārambhavâda"; the Sāmkhyas and Yôgapatâñjals believe in the "Parinâmavâda"; while the Brahmvâdins or Vêdântins are also known as the "Mâyavâdins." These are the three successive but quite compatible theories in the development of scientific knowledge. The "Ārambhavâda" is the theory of atomic agglomeration. It teaches us that

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\* "The Vêdānta philosophy", p. 29.

† Thus Madhusûdana Saraswati in his "Prastānabhêda" writes:—"This, the Vêdānta, is indeed the principle of all doctrines, any other doctrine is but a compliment of it, and therefore it alone is to be revered, by all who wish for liberation and this according to the interpretation of the venerable Samkara."

"an effect which was not (the world), is produced through the activity of causes which are." Its advocates believe that the Universe previous to its manifestation was a chaos engendered by the aimless play of a few kinds of atoms (*Anu*), which, by becoming successively double and treble and multiple atoms, began the world. This is not a whit different from the favourite atomic theory of the modern chemist, and could not have resulted save from a strict scrutiny of the four Laws of Chemical Combination, namely, (1) the persistence of weight, (2) the Law of constant composition, (3) the Law of multiple proportions, and (4) the Law of reciprocal proportions, all of which in their turn are the generalizations from observed facts. Naturally, therefore, we are driven to the conclusion that the ancient Hindus had acquired as much experience of the Chemical Laws as the advocates of the incorrectly-termed-modern atomic theory are known to possess. They should have carefully observed facts and formulated the Laws of "combination by twos and threes," and then as a matter of mere sequence, postulated the theory of atomic constitution of matter. That they had observed facts employing the modern method of experimenting, analyzed them, and drawn the legitimate inference from them is evident from the *Mīmāṃsa* brought out by the venerable Jaimini. Dharma, the object of this *darsana*, has been explained as a synonym of what we now call Natural Law, which "arises after the experiment (*yajña*) producing it has been performed". The body of this work is mainly devoted to the consideration of the differences and varieties of Dharma, the principle purpose and order of each set of experiments (*Yajñas*), the co-ordinate effect, *i.e.*, the co-operation of several experiments for a single result, and such other questions. In brief, the Karma *Mīmāṃsa* serves

the purpose of a concise summary of the salient methods of modern chemical science; and the first theory, the atomic theory, that suggests itself to the mind after a careful perusal of the facts of chemical science, is recorded in the Nyāya and Vaisēshika. Thus the Vaisēshikas, besides other problems, ponder over matter, the different kinds of matter, the chemical affinity, and in the end postulate the atomic constitution of matter, thus making it clear, that since from the facts recorded in the Vedas, a Chemical theory of the Universe, the same theory which the modern Scientists have once again stated most ardently just a little while ago, is promulgated, those facts must of necessity be part and parcel of the chemical science.

The second theory, that of "Parināmavāda", is in modern scientific terminology called the Theory of Evolution. It says "that Pradhāna alone, sometimes called Prakṛiti or original matter, composed, as it is, of the Guṇas of Satwa, Rajas, and Tamas is evolved through the stages of Mahat and Ahaṅkāra into the shape of the (subjective and objective) world. From this point of view the effected world existed before as real, though in a subtle (invisible) form, and was rendered active through the activity of a cause". This does not, as is erroneously supposed by many, contradict the atomic theory of the "ārambhavādins". This consistency, of course, ought to be the case, for these two theories rest on scientific facts. We hope not that any evolutionist would venture to say that the theory of evolution does contradict the Chemist's atomic theory. Nay, the Theory of *Māyā* that is, the electron theory of matter, did lead the Vedic scientists, as it has led the moderners, to a totally different view of the constitution of matter, but still it made little



alteration to the Chemist's atom. Hence no necessity arose to rule out the Vaisêshika theory as inconsistent with the other theories. Further, the co-existence of these theories should not be mistaken for a proof that they were developed by independent and opposed schools of thinkers, but, on the other hand, it would be correct to infer that it was possible only because of the fact that these theories, being wholly dependent on the indisputable facts of science, can be true at the same time.

The Vêdântin knows that matter as we perceive it is not the reality in its true perspective. Behind it there is the "self-luminous and perfectly blissful Brahman," the Existence-Knowledge-Bliss, "which has no second and which *appears*....., through its own power of *Mâyâ*, as the world. It is very difficult to find in English an equivalent for *Mâyâ*. At first it signified the potency of motion with which the electric energy was endowed during the time it retained the character of an "electron". In virtue of this potency of motion the immaterial energy acquired the properties of matter. Consequently, in its second stage, it was also understood to connote the chief innate characteristic of Matter; or Matter itself. True Vêdântin, however, believes that matter is the result of the combination of *Mâyâ* and the fundamental (*i.e.*, electrical) energy of the Universe, the two immaterial but final parts of this manifestation—Motion and Energy.

It is clear that the so-called "six systems of philosophy" are in reality the inevitable offshoots of the same Vedic stock, and that the contention that this is a mere speculative philosophy is a gross misrepresentation of fact; for this philosophy embodies the main generalizations of Natural Philosophy. The six branches of the Vedic Philosophy are mutually related in that the theory of the Vaisêshikas is the

first stage in the progress of science and the theory of *Māyā* the culminating one, while the theory of the Sāṃkhyas speaks of the evolutionary process in the course of manifestation. The scientific method of argumentation and the scientific bent of mind of the authors of these theories, are clearly manifest all through these different branches of Vedic Philosophy. None of them contradict the others; but they embody the three important theories of the scientific world.\* And since they have been developed from the principles recorded in the Veda, the Veda must needs be the totality of scientific facts and principles.

\* This is the reason why Madhusūdana observes: "But in reality, all the Munis who have put forward these theories agree in wishing to prove the existence of the Supreme Lord without a second, ending in the theory of *Māyā*. These Munis (scientists) cannot be in error, considering that they are omniscient; and these different views have only been propounded by them, in order to keep off all nihilistic theories, and because they were afraid that human beings, with their inclinations towards the objects of the world, could not be expected at once to know the true goal of man. But all comes right when we understand that men, from not understanding their true object, imagined that these Munis would have propounded what is contrary to the Veda, and thus, accepting their opinion, have become followers of various paths." Madhusūdana, however, has failed to understand, owing to his own inability to discern the latent scientific character of the Veda, that even though the Rishis had desired to bequeath to their posterity but one convenient theory of our existence, they could not have done so simply because these various theories are essential to explain the observed facts of science. Or, conversely, since the Rishis could not but preserve for us these three theories, the *ārambha*, *parināma*, and *māyā vādanā*, although they were fully aware of the fact that a plurality of theories would only help to generate and nourish disbelief and weaken the authority of each and all of them, they should be supposed to have based the theories on indisputable and immutable facts of science. Hence also the proof that the Veda is scientific in character.

The Vêdânta philosophy has three standpoints, the Jñâna, Karma, and Bhakti Yôgas, which are the three apparently different ways of self-realization. Krishna has concisely yet decisively established in the case of all the three doctrines the identical outlook of one's mind. The Jñâna Yôga, as the term Jñâna signifies, has for its basis that knowledge which results from a purely scientific investigation of Nature and its Laws, and is simultaneously an analytical and synthetic explanation of our existence. Although our present knowledge of the Physical Sciences is quite inadequate for the achievement of this purpose, yet it contains the germs that would soon develop into the magnitude that was in possession of the ancients. There can be little doubt of the fact that the sages of yore had valuable instruments and accurate methods that secured to them the complete analysis of the physical as well as the psychic departments of Nature. To say the least, they were much more acute in reasoning and profound in intuitive perception than our own revered Scientists. This is amply attested by the symbolism and the method of representing the scientific facts adopted by them. The sun is represented as journeying in the sky in a one-wheeled chariot, driven by the thighless Anûra, and drawn by a team of seven horses. The reader might try to unveil this figure of speech given that the seven horses represent the seven orders of rays that generate the seven colours of the solar spectrum.

It has been stated in a previous chapter that the Upanishads have expressly laid down the rule that any knowledge of Brahman, the innate cause of Prakriti and Purusha, must be preceded by a knowledge of Dharma, the aggregate of the Laws of Nature, the reason being that we can understand the former only through the latter.

This view has been supported by *Kṛishṇa* in the *Bhagavad Gīta* and by others in other works, and this is the meaning of the statement that the *Jñāna Yōga* has originated out of scientific investigation. *Jñānam* is knowledge and there is no knowledge, at least from the point of view of the Hindu *Sanyāsi*, that is not acceptable to science taking the term in its widest significance. Such, indeed, is the inference that will be drawn by a consideration of the ideas on which the *Jñāna Yōga* is built. The *Vēdāntin* does not intend to supply—it is, in fact, far too much out of his jurisdiction to do so—the exact proof of the axioms on which he bases his arguments. He leaves the reader to gather this proof from the *Vedas*. The deductions of science such as that opposites exist eternally ; that the whole manifestation is governed by a wave-motion ; that the three *Guṇas* are the properties of manifested things only ; that there is a fine state of matter, an ether, beyond this gross representation of it ; and that there is also a psychic force, sometimes termed the subjective mind, enveloping and pervading the whole manifestation :—these are the fundamental axioms of their philosophy, which aims at guiding us to perceive action in inaction and inaction in action, and to perform action for action's sake. These certainly cannot have originated without the knowledge of the contents of modern exact sciences.

Modern critics have unconsciously cultivated the habit of ignoring this aspect of the *Vēdānta* philosophy. To them the phrase *Vēdānta* philosophy signifies nothing more nor less than a peculiar system of “dispassionate enquiry by the light of reason into the first truths of existence which we shall get at by a careful dialectical scrutiny of the concepts of the reason.” They do not concede that the originators of this philosophy had observed scientific facts, become accustomed

to the Laws of Nature, and were gifted with an abundance of intuition. In reality, however, the Vêdânta philosophy rests on all these requisites. The ignoring of this fact which in the usual course ought to form, as it were, the natural starting point of any criticism on the Vêdânta, has naturally enough misled many an ardent critic and blinded them to the true explanation of its characteristic conceptions, such, for instance, as the theory of *Mâyâ*.

Theories whether they belong to the civilized or aboriginal, noble or profane, cannot originate without suitable food for the mind to prey on. The theory of *Mâyâ* could not have originated from anything but an actual observation of facts. Any argument to the contrary will be confronted with this question: how many theories are there which are not woven out of known facts? Or, again, if it be urged that it is not necessary to suppose the theory of *Mâyâ* to have originated from scientific facts, the Hindu pertinently asks for the not-forth-coming reasons as to why the numerous philosophers, save the ancient Hindu sages, were unable to postulate a theory, at least comparable to it, in the natural course of their philosophic speculations? The theory of *Mâyâ* is unique in the philosophic systems of the world, a distinct phase characteristic of the Vêdânta alone; and yet the moderns will not concede that it has originated in a distinctly different way from that of the metaphysical abstractions of other peoples. But, fortunately, this feeling is fast dying, and it is hoped that the explanation of *Mâyâ* given in this chapter will altogether put an end to this scepticism.

If the knowledge of the Physical Sciences is not the premises from which the *Jñâna Yôga* is built up, why then should these very Yôgis be mentioned in connection with *Yajñas*? None who was not a Yôgi could be called a *Rishi*,

and none who was not a "Mantradrashṭa" could bear the title Rishi. The term "Mantradrashṭa" has been explained to mean a Scientist; where then is the impropriety in stating that the axioms from which the Jñāna Yôgâ is developed are the scientific theories of the modern world?

It cannot, therefore, be gainsaid that the Jñāna Yôga has scientific investigation for its foundation, and that, consequently, the Vêdânta rests securely on the by-no-means-insufficient knowledge of what we now term the Physical Sciences and what was called by the Rishis the Veda (scientific knowledge). What is this much respected Vêdânta? What are its principles and aims, and what is the result of its adoption? Vêdânta, in few, is the sum-total of the not discontinuous logical deductions as to what life and existence are that voluntarily offer themselves when a perfect stage in scientific investigation, which does not leave scope to even the shadow of a doubt, is reached. It is for this reason termed "The Science of Sciences," and is the composite knowledge of the results of the positive sciences. Our present scientific knowledge, though yet in its teens, has produced extraordinary results, and unceremoniously compelled us, however unwilling we might have been at the beginning, to accept the truism that the gross Universe has evolved out to be what it is now from a more or less incomprehensible substance, the ether. The scientific men of to-day do not possess facts enough from which it may be possible for them to specifically demonstrate the how and the actual whence of this ether. But because the Rishis by dint of perseverance and *tapas* could attain to the summit of this inaccessible mountain-barrier, and look on what rested on the other side, it was possible for them to establish that Âtman, the subjective

principle of the Universe, existed, and all that existed was but *Ātman* Itself.\*

The enunciation of the existence of an all-pervading *Ātman*, has been the result of a strict adherence to the scientific method of argumentation. People are not far to be sought, who, proceeding from the fallacious assumption that all cause must have had a beginning, believe that arguing from effect to cause with a view to infer the primary cause of this existence, is futile. But the logic of the scientific method of investigation does not give room to this illogical assumption. It admits, no doubt, that there must be an origin to any cause whatsoever; but only if the cause is neither infinite in time and space nor devoid of attributes. On the other hand, when the cause is such that it is infinite in time and space, or is devoid of all predicables that science knows of, then surely we are not justified in inferring that this unintelligible something has a cause. To search for a cause which neither reason nor experimental tests can gauge or analyse, is not only unwarranted by science but an unprofitable madman's job. The idea of a cause dawns on us only through the knowledge of the effects and the relation subsisting between the effects and their cause. Were man, by some unaccountable and innate condition of Nature, incapable of discovering the relation subsisting between cause and its effect, the Natural phenomenon, for sooth, then, we

\* "In one half verse I shall tell you what has been taught in thousands of volumes: Brahman is true, the world is false, the soul (*Ātman*) is Brahman and nothing else."

And again:—

"There is nothing worth gaining, there is nothing worth enjoying, there is nothing worth knowing but Brahman alone, for he who knows Brahman, is Brahman."

Such is the résumé of the *Vēdānta*.

may declare that we can never reach the real solution of the fundamental cause of this manifestation. But science has all along been proving that nothing but the reality can hold its own against man's scrutinizing investigation, and that Nature possesses neither a Law nor an Agent from knowing which man is precluded. The relation existing between causes and effects which make up this manifold manifestation, is thus an intelligible one; and the analytical investigation of this manifestation will not be impeded unless we ultimately approach a cause that is either infinite in time and space or devoid of all attributes known to science.

The investigation of the activities of Nature carried out by the Rishis led them to record the following statements. The *Bṛihadâraṇyaka Upanishad*\* says :—

“Verily in the beginning this was Brahman, one only. That being one was not strong enough. It created still further the most excellent Kshatra (energy), viz., those Kshatras among the *Devas*,—Indra (electricity), Varuṇa (oxygen), Soma (alcohol), Rudra (radioactive matter), and others. Therefore there is nothing beyond the Kshatra, and therefore at the Râjasûya the Brâhmaṇa sits down below the Kshatriya. He confers that glory on the Kshatriya alone. But Brahman is (nevertheless) the birth-place of the Kshatra. Therefore a king is exalted, he sits down at the end (of the Râjasûya) below the Brâhmaṇa, as his birth place. He who injures him, injures his own birth-place. He becomes worse, because he has injured one better than himself.

“He was not strong enough. He created the Vis (those which pervade), the classes of *Devas* which in their different orders are called Vasus, Rudras (rays from the radio-active

\*. 1, 4, 11—14. Translated by Max Müller, the bracketed words being ours.



matter), Âdityas (the elements), Visvêdêvas (the products of oxidation of alcohols), and Maruts (the rays of the vacuum tube.)

"He was not strong enough. He created the Sûdra class, as Pûshan (as nourisher). This earth verily is Pûshan (the nourisher); for the earth nourishes all this whatsoever.

"He was not strong enough. He created still further the most excellent Dharma (Natural Law). Dharma is the Kshatra (power) of the Kshatra, therefore there is nothing higher than Dharma. Thenceforth even a weak man rules a stronger with the help of Dharma, as with the help of a king. Thus Dharma is what is called the true. And if a man declares what is true they say he declares Dharma, and if he declares Dharma they say he declares what is true. Thus both are the same."

In these passages it is maintained that the components or Agents of Nature may be scientifically classified into four groups: namely, (1) the subjective mind or the psychic force of which the physical energies are the offshoot, just as matter is the result of the immaterial electric energy; (2) those that are of the nature of energy, for instance, electricity, or that give rise to energy of one kind or the other, such as, radio-active matter, alcohol, and oxygen; (3) those that are derived from the objects of the previous category, and which pervade the whole of organic and inorganic Nature, such as electrons, active radiations, and the oxidation products of alcohols; (4) and lastly, the earth and its contents, both organic and inorganic things, which are made up of those of group (3), and which serve the purpose of "all this whatsoever." This classification, it may be easily gathered, is characterized by a thorough scientific method of argumentation and clear insight into the

fundamental laws governing the reactions among the Agents of Nature. It may not be possible at this stage of our knowledge to experimentally demonstrate the accuracy of the remark, which nevertheless is too true, that physical energy is an outcome of the subjective principle of the universe: but it is more than proved by recent researches into the nature of electricity that matter with its manifold forms is but the immaterial inertia that is eternally bound up with the fast moving electric charge. The sequence mentioned in the above enumeration, is, therefore, a natural and the only possible and valid one: and according to it does Brahman, or Ātman, or what is the same thing, the subjective principle of the Universe, top the list. Hence is Ātman proclaimed the ultimate reality.

A consideration of the doctrine of *Māyā*, the culminating theory of the Vedas, would enable us to further substantiate the proposition that the Vedas are treasure-houses of scientific Truths. *Māyā* has been very wrongly understood to mean illusion.\* It is not proposed to waste time and space in dilating on the absurdity of this interpretation. Nor does it require any amount of serious effort on our part to refute the statement that *Māyā* is the limitation, which our intellect experiences by virtue of the constitution of our brains, which enforces the perpetual perception of matter only as it appears, and by which we are naturally rendered incapable of becoming conscious of the fact that the visible universe does

\* Max Müller in "The Vēdānta Philosophy" (p. 128) rightly observes: ".....whatever may have been written against it, Colebrooke, I think, was perfectly right when he said 'that the notion that the versatile world is an entire illusion (*Māyā*) and that all that passes to the apprehension of the waking individual is but a phantasy, presented to his imagination, nay that every seeming thing is unreal, and all is visionary, does not appear to be the doctrine of the text of the Vēdānta.' "

not in reality exist. The next and a more formidable standpoint is that it is ignorance by which humanity is barred from distinguishing the real from the unreal, actual from the superficial, and, consequently, is attracted by the pairs of opposites and subjected to pain and pleasure.

Consider a portrait of excellent workmanship. Look at it with all the concentration at your command. You see the bewitching scenery of the chains of blue, brown, and dark hills that appear to encircle you; the zig-zag path of the furious and foaming river with its tuned yells, commingled with monotonous semi-musical jargon, rushing at an extraordinary pace past by an adjacent pyramidal hill, as if it wanted to boast of its strength by immediately dislocating it; the scantily spread but dignified and awe-inspiring trees with their charitable burden of green foliage, sumptuous fruits, and intertwining twigs that passionately embrace their trunks with ever so many twists and curls, lest they should lose their beloved ones; and, to cut short this digression, the variegated vegetation, not taller than a foot at its best, lazily posing on the almost smooth ground of the plane, and inviting the occasional passers-by to give them the pleasure of suffering their soft foot-prints and thus afford the wearied travellers invaluable hospitality by making them feel for once at least that they are walking on the exquisite planes of the very paradise, not on this mortal world whose only qualification is that everything in it is a web of mistakes.

In a spot of this solitary area, where green grass is smiling in its united glory, which is all the more enhanced by the concentrated effect produced in your mind by the odorous flowers, some scattered on the ground while some are just blossoming out reminding you of your own frailty and evanescence; and at a time of the vanishing hours of the eve

ning, when the sun, having finished his majestic tour in the skys purporting to inspect whether all beings are healthy, wealthy, and wise, has deemed it pleasurable to throw on this already beautiful scenery his long, enlivening, and gorgeously tinted arms, producing a number of phenomena none of which is likely to depress the spirits of even the most cynical onlooker, as though it were his parting embrace of his delicate and beautiful spouse ;—at such a spot and time, and obliquely facing the now-imposing river, an ethereal damsel, a Môhini, is seen enjoying a swing. Indeed, her prepossessing appearance and her fair complexion associated with the long and flowing dark hair ; her charming looks, unwittingly directing your attention by their timid and bashful but penetrating character towards those crimson lips, conveying in mute language that you are invited to satisfy yourself as to whether they possess that *amrita* which befits the truly accomplished *Rasika* ; her long, elegant, and proportionately poised arms, extending outwards in order to secure a not uncertain grip of the supporting inelastic but docile chords, displaying in their outstretched form their magnificent feminine build and delicate texture ; her bosom with its protruding twins thinly covered with the flying end of her gray *saree*, producing convulsions in your love-lorn heart inasmuch as it decorates that angelic form with a surpassing beauty at the same time declaring silently the unsullied chastity of her youth ; her slender waist, her steady legs with their soft and rosy extremities :—and, in short, every inch of her body might easily ridicule any object in Nature with which you may deem it worth while comparing, although Nature's ingenuity, inventive capacity, and her extraordinary power of refinement in other departments of her activity are second to none.

What are you looking at so intently, dear reader? O! is it at the varied figures and faces cut by her hair and the loose parts of her swinging-habit in virtue of the swift swing she is taking? Yes; I do agree with you that not even the most experienced artist can materialize them. Do you also say that you hear the soft rustling of her garment, the sharp shrieking yet not altogether displeasing notes made by the branch of the tree in virtue of the momentum which it is subjected to though the precious burden, compatible with her beauty, is, indeed, very light and agile? Alas! poor reader, you wish you could "have a chat" with the beauty, don't you? Just like you who, having forgotten the inanimate nature of the portrait, have fallen a prey to the notorious hallucination, there are millions and hundreds of millions of human beings on the face of this earth, who, forgetting that the world is the portrait painted on the background of *Chidākāsa*, get themselves engrossed in *Māyā*, whereby rendering themselves amenable to pleasure and pain.

This view of *Māyā* which is very common among the modern religious men of India, tries to emphasise its ideal view and discount the reality of the manifested universe, and, consequently, has been the direct cause of the nation's degradation. The example of the portrait is supposed to afford a suitable analogy to explain *Māyā*. Little did its exponents suspect the inherent incongruity of this comparison. In all analogical arguments, the utmost vigilance and scrutiny must be observed in order to give full effect to the axiom that, the laws governing the subject matter observed are identical with those of the subject matter under investigation. Judged by the light of this axiom, the example of the portrait turns out to be a bad analogy to the principles involved in *Māyā*. In the one case there are three distinct agents, an artist, the

board on which the picture is drawn, and the materials with which the form is painted and decorated; while in the other case there is only one entity, Brahman or *Ātman*. The extant kinetic and potential forces and divinities of this universe along with that which is on the other side of manifestation, that is, the subjective universe, are to be known as Brahman. It is secondless, for all that is is included in it. Again the portrait cannot be in the making for ever, while the world is. The portrait when finished shows us no signs of change, but the universe is moving onwards under the impelling forces of a ceaseless change. No materials from outside the Brahman are required to build up the universe. There are yet other inconsistencies in the analogy instituted by men who had not the initiation into the esoteric explanation of the Vedas, and it would be folly on our part to commit ourselves to their doctrine.

What then is this *Māyā*?

It is not even ignorance of the Laws of Nature, though there are statements such as, "as soon as thou seest that the modifications of the elements are nothing in truth but the basic elements themselves, that very instant, freed from bondage, thou shalt abide in thy own nature." \*

*Māyā* is a descriptive term applied in the ancient scientific literature of the Hindus to the statement that matter is not an independent entity, but only the inertia (an immaterial attribute) manifested by the fast-moving electrons. This statement has been verified by our recent researches in the province of electricity. We have already referred to the fact that, when an electric current is passed through a vacuum tube, we get what we call the Kathode and Anode rays but what the *Rishis* called the *Aswins*. The

Kathode rays are composed of tiny charged particles called electrons, moving at a very rapid speed, some equalling to  $\frac{1}{3}$  the velocity of light. Physicists have measured the velocity and mass and the quantity of electric charge of these particles, and have reached the conclusion that their mass is wholly due to the electric charge in motion. The positively electrified particles issuing forth from the Anode are much more massive than the electrons from the Kathode. It is generally admitted now that it is these two kinds of electrons that have given rise to matter. "An atom of matter consists of a central nucleus with one or more elections revolving in orbits around it. The nucleus consists of positive electrons, the planetary electrons, being negative. Each atom (of the same element) has the same number of positive and negative electrons, and these range from 1 in the case of hydrogen, to 92 in the case of uranium. For each of the intermediate numbers the existence of a distinct element may be inferred, and in actual fact there are at present only four gaps in the series, four elements yet to be discovered." The leaders of scientific thought have therefore opined that all Matter is composed of these electrons; and since the mass of these electrons is only the inertia due to the very high speed of the electric charge that they are made up of, the whole matter of the Universe is thus proved to be of electrical origin. A body itself does not show any sign of electrification, because it consists of equal quantities of the opposite charges. And the term *Mâyâ* was intended by the Rishis to lucidly express this theory derived from the most important scientific facts.

We now proceed to prove that this was the meaning which the Rishis attached to the word *Mâyâ*. In the first place what does *Krishna*, the latest of the ancient represent-

atives of the Vedic faith, say about the term? He says that this material Prakriti of Brahman is known as *Mâyâ*. He is not in the least ambiguous here. All that he means is that what we call Matter is *Mâyâ*. It is not the feeling of diversity and variety, it is not our inability to control our mind and direct it along the proper channels, it is not the statement of the fact that human nature is entangled in ignorance and temptation, and it is none of any other facts of imagination and superstition, but a term applied to the Matter of this universe. If the reader does not respect the authority of Krishna, who else can stand an authority to him? Krishna, who has enriched our knowledge of the Laws of Nature by largely contributing towards the right understanding of the Vedas, has declared in the Bhagavad Gîta that *Mâyâ* is his material Prakriti and nothing but that. We also read in one of the Upanishads thus :—*Mâyântu Prakritim vidyât*, "Let him know that Prakriti is *Mâyâ* or *Mâyâ* Prakriti". Why then should we entertain unfounded misgivings?

Now we give below two citations, one from the Veda and the other from the Upanishads, which deal with the term. We have the Vedic text :—*Indrô mâyâbhih guru rūpam iyatê*. Indra has been explained already to stand for electrical energy. The term "guru" is here used as an adjective qualifying "rûpam" which is in the objective case. In physics the word "guru" means "weighty or massive". According to modern science, matter is described to be that which has mass and occupies space. This is exactly what is connoted by "gururûpam". The term "guru" when applied to matter, gives it the sense of mass or weight; so that "gururûpam" means *massive or weighty form*. This is the



definition of matter as it comes to us from the *Rishis*; they did not know that it was an independent entity. But they knew it to be something which had mass and presented a form. The expression form contains the idea of occupying space. No better definition of matter is available in this advanced age than the one given by the *Rishis*. What more appropriate term than “gururûpam” can be invented by our expert scientists, to designate matter in the light of the electron theory? But how did this “gururûpam” originate? The *Rishis* state that “Indra (electrical energy) assumed weighty form through his *Mâyâs*”. We have here the exact meaning of *Mâyâ*. It is that potency (of motion) in virtue of which the electric charge is endowed with inertia transforming it into matter. In a modified but allied sense, it refers to the immaterial inertia which has emanated from Indra, the electric charge in motion.

We read in the *Svétâsvatara Upanishad* thus:—

“He who does not know that indestructible deity of the *Rig Veda*, the highest ether-like wherein all the *Devas* reside, of what use is the *Rig Veda* to him? Those only who know it, rest contented.”

This indestructible *Devata* of the *Rig Veda* is Indra (electrical energy). The next two verses deal with the *Mâyâ* of this force of Nature.

“That from which the *Mâyin* (Indra) sends forth all this (universe)—the theorems contained in the *Vedas*, the *Yajña*, the *Kratu*, the past, the future, and all that the *Vedas* declare—in that (electric energy) the other (*i.e.*, *Prakriti* or the *gururûpam*) is bound up through that *Mâyâ*.”

“Know, then, that *Prakriti* is *Mâyâ*, and the great

Lord (Indra) the Māyin ; the whole world is filled with what are his members." \*

The first of the last two passages informs us that the substance of the electric energy, with which inertia and space-occupancy characterizing matter are invariably bound up, is the original substance from which this universe (*i.e.*, matter, energy, and the laws subsisting between them) has been manifested. When the world is spoken of as *mithya* or unreal, it is this that is meant—not that it is unreal to us, but unreal from the point of view of the Māyin. That is, matter is as real to us as is Indra himself : but without Indra there could not have been matter at all. *Māyā* is an attribute of only the highest deity of the Vedas, namely, Indra, and no other *Devata* possesses this power.

If more proof than what is given above is required, we can but quote again from the Upanishads.

"This grand science was proclaimed by the Aswins (the rays of the vacuum tube) which consist of the embodied or corporeal electric energy (*dadhyañgātharvanah*, *atharvanah* meaning *Siva* or electric energy), and the Rishi who perceived this said :

'I make manifest these electrified particles (literally, *Narāsana* means the seats of Indra), these incandescent (*ugra*) rays (*vrishhti*) of the vacuum (*na*) tube (*tanyantu* is the name of an instrument), and these which consist of corporeal electric energy, from the left electrode (literally, *vama śirsh-nat* means from the left head) of the X-ray bulb (*aswa* of the *aswamédha Yajña*).' *Bṛihadâraṇyaka* II, 5, 16.

"He (Indra) became like unto every form, and this is meant to reveal the (true) form of him. Indra appears multiform

through the Mâyâs, for his horses (the electrons) are grouped together, hundreds and tens' ". *Bṛihadâraṇyaka* II, 5, 19.

"May he who is the strong bull of the Vedas (Indra), assuming all forms, who has risen from the Vedas, from the Immortal, may that Indra strengthen me with wisdom! May I, O God, become an upholder of the Immortal!" *Taittirîyaka Upa.* I, 4, 1.

In the first of these passages there is a plain statement of the principal fact revealed by the discharge of electricity through a vacuum tube, which has been dealt with in the previous chapter in connection with the verses dealing with the Maruts; namely, that when a current of electricity is passed through a vacuum tube, rays composed of electrons will be produced. In the next passage it is mentioned that it is this electric energy that has manifested itself in the form of objects (matter) of the universe. It is also said that this evolution of matter from electrical energy takes place through the power of *Mâyâ*, which systematically groups electrons together so as to produce different kinds of atoms of matter. The expression "his horses" occurring in this excerpt, cannot but refer to the electrons composing the "incandescent rays" of the preceding passage, inasmuch as in the latter they are designated by the term *Narâsana*. It is, therefore, clear that the modern theory of the electronic constitution of matter has been known to the ancient *Rishis* of Bharatavarsha.

*Sâyana* explains the term Indra thus:—*Indrô hi paramâtma rūpêna, idam jagat karôti. Aupamanyava nâmakô munih idam darsanât indrah, iti nirvachanamâha.* This means: "Indra creates this world with the form of Paramâtma. The Rishi Aupamanyava perceived this: hence the term Indra."

This evidence from the Vêdânta conclusively establishes that *Mâyâ* is a scientific term connoting the idea that matter is of electrical origin. What then could be the Veda in which this term is defined, explained, and advocated.

What has been theoretically established in the preceding pages, has been practically attained by the ancient Hindu society. The people of Bharatavarsha have been, till recent times, staunch admirers and followers of the system of *Âsramas*. The Rishis who had a complete knowledge of the human mind and its working, and had investigated the theory of Karma in all its phases, chalked out the safest path for humanity in its undulatory motion towards the destined end—Self-realization. The four *Âsramas* form a system which proposes to train up the human mind in its dual capacity of an objective and subjective agent. The training necessary to perfect the objective phase of the human mind is afforded in the *Brahmacharya* and *Grihasta âsramas*, while that which would educate it to transcend the conditions and limitations of the material plane is derived from the *Vânaprasta* and *Sanyâsa âsramas*. Of these four, the *Brahmacharya* and *Vânaprasta* may be considered to be institutions for training, and the other two to be spheres of action, experience, and attainment of the goal.

The word *Brahmacharya* is a compound of *Brahma* and *Charya*. What *Brahma* means has been explained. *Char* is the root of *Charya*, which, therefore, means the way or path, so that *Brahmacharya* means the path (towards) *Brahman*. *Brahmacharya âsrama* is an institution to which a student will apply for admission, with a view to secure that instruction which will lead him to the understanding of *Brahman*. *Brahma* is of two grades, the lower and the higher. The former is named *Dharma* and the latter

Brahma in order to differentiate the two grades. Brahman is to Dharma as cause is to effect though in effect Dharma is only the "shadow" of Brahman. But for the fact that the human mind especially in its elementary stages of development cannot reconcile two antagonistic views of one and the same subject, as is the case with Brahman in its two aspects of Prakriti and Purusha, there would have been no necessity for this division. This is the reason why a Brahmachâri, in whose case the rule that the known ought to be taught before the unknown should be observed with the utmost precision, is initiated into the esoteric doctrine of the Veda, which embodies the relations existing in Prakriti, before the Vêdânta dealing with the actual Brahman is taken up. Brahmacharya *âsrama* provides the student with the necessary equipment by way of experimental work, specially directed towards the understanding of Natural Law or Dharma. He learns also certain principles and laws of social Dharma with a view to enter the Gârhasthyam, the stage of practical usefulness, in the ordinary case; but when he has strong propensities compelling him to deviate from the usual path of habit and custom, he may forthwith launch into the Sanyâsam.

A student in the first *âsrama* will have developed and exercised his intellect over and above any other faculty. But this alone will not do for the attainment of Self-realization. There is yet a formidable sphere of mental action, that of emotions, and Grihastha *âsrama* affords him the best opportunity for development in this direction besides placing before him an extensive field for experiment and action. His academic knowledge of Dharma will be put to the most severe test here. He has to work for his family, his society, and his State.

The few that have stood the test in the first *āśrama*, and consequently have obtained the key to the hidden meaning of the Veda, do often withhold from taking to *Gārhastyam*, and instead enter either *Vānaprastam* or *Sanyāsam*. The eminent ones from among these are chosen to act as Gurus to Royal families and the nobility. Their business is to train up the members of these families in the art of using scientific instruments and inventions for the purpose of war.

The *Grihasta āśrama* is the source of most of the income of the remaining three *āśramas*, the rest of whose expenditure being met by the State. But it must be admitted that this is true only of institutions which came into existence much later than the period ending with the *Mahābhārata* war. Instances are not wanting that go to prove that, before that epoch-making incident, every institution was self-maintained, by virtue of the possession by its members of such scientific knowledge that did not leave them in want of anything, if only our readers apply themselves to the scanty yet sufficient historical records that are left in the *Purāṇas* and elsewhere. The *Naimi-sāranya* institution is the most important of them.

The raw recruit from the *Brahmacharya* will find it very trying to suit himself to the new environments in the *Gārhastyam*, which usually consists of a majority of selfish individuals. Hitherto he has been living in a world of thoughts, ideas, and abstract reasoning. But now he suddenly finds himself plunged in an atmosphere of feelings, motives and prejudices. Of course, as he would easily get himself absorbed in it, this change will not have a lasting effect in the case of a *Brahmachari* who had not the privilege of initiation into the esoteric (scientific) meaning of the Veda due to lack of *Sraddha* and *Bhakti* on his own part, and also, perhaps, due to his natural disposition of aimless

worldliness, but only had undergone that monotonous and practically useless course of instruction which is yet in vogue in India—that of learning the Veda by-heart and with reference to linguistic proficiency. Such young men rarely receive the higher instruction, that of Âtman. They are provided with a knowledge of the Dharma Sâstras and cognate subjects, in order to help them secure a decent position in society. It is different with the strenuous band of Brahmacharins. Their intellectual abilities are such as to evoke the sympathy and trust of their Gurus. The extraordinary possibilities of kindness, sacrifice for public weal, righteous conduct, and disinterested work that are inherent in their very natures, make the Guru conscious of the kind of instruction sought after by them. Were it not for this discriminating capacity of the Guru in choosing worthy recipients for deep scientific knowledge, the Hindu nation could not have held unswervingly to the one ideal of Self-realization through all the bygone millions of years.

Some of these celebrated pupils enter the social arena with the express desire of re-establishing social equanimity and justice. The effect of the change which they experience on entering the *Grihasta âsrama* is not of a transient nature, inasmuch as the consciousness of the change is supreme in their minds since it is self-instigated and self-imposed. Their idealistic views must needs come into collision with the ideas and practices of the common humanity. This combat, imperceptible to the external world, is most rancorous in the mental atmosphere of the assailed individual; so much so that only the owner of the highest mental calibre can succeed in coping with and eventually overcoming the antagonism. Krishna was a prey to this in his early years. Smitten with the feeling of lack of

almighty power, with which alone he could overcome the strong; valiant, but malicious and wicked monarchs of his time, who, moreover, were the direct authors of the then prevailing social unrest, and guided by his natural self-consciousness so uncommon among the present pigmy inhabitants of this world, he hastened to the Rishis of the Himālayan valleys, and there, to his heart's content, succeeded, after performing severe *tapas* extending over ten long years, in inventing and possessing that mighty Chakra, the defier of all opposition, along with other and less powerful weapons of destruction.

This then is the *Grihasta āsrama* : that it is a stage which affords us scope to perfect that knowledge of the Veda which is imparted in the first stage, with a view to achieve supreme command over this material manifestation in all its phases by submitting oneself to its laws.

Mere control of this lower Brahman no doubt leaves us in a suspense as to the real nature of the controller, the *Ātman* or the subjective universe, but it is at the same time the first stage towards its proper understanding. The ideas about *Ātman* begin to mature now that the real nature of its shadow is experimentally defined. By degrees these assume material forms, till at length one is forced to look beyond the objective phase of Nature for a complete grasp of *Ātman's* nature. Necessity drives one to seek shelter in *Vânaprastam*, where the only function will be to get acquainted with the *Rājayōga*, the treasury of intuitive perception. This stage, being a probationary one, does not altogether resemble the *Brahmacharyam*, since the present position of the student being the resultant of both his experience and the conservatism of his mind,—which latter is the progenitor of prolonged attachment,—prevents him from totally freeing himself from this



world. Now he is found advising and directing the society, and now sitting at his Guru's feet to learn the paths and means of Yôga. He generally has a number of pupils about him seeking after truth, and he feels it his bounden duty to train them up in the paths of Dharma.

During the first two *âsramas*, the knowledge of Prakriti was the end and all. But now the aim and the methods of its attainment are different. For the study of the former, the physical senses were made use of. Not this is the case with that of the latter. The student in this third stage, has to study these very senses and their lord, the intellect. With necessary means and experimentation, it will be seen that every part of the body is under the direct or indirect control of the intellect. In its turn intellect will be known to be not an eternal entity but a resultant of mass and motion, and a very fine condition of Prakriti. The link which connects Âtman (the subjective principle of this universe) and the intellect is Ahañkāra, and this is responsible for the cognition of Diversity. Reason is eternally bound up with Ahañkāra; transcending the one secures the conquest of the other. Therefore, to realise Unity in Diversity, training in intuitive perception must be undergone with the sole object of eliminating Ahañkāra. Yôga is the name given to this training.

In Vānaprastā *âsrama* the intricacies of this Yôga are experimentally demonstrated. The various stages are practically shown, and the student is initiated into them under the direct guidance of the Guru. The student, who, probably, by this time has set one foot in the grave, if strong enough for unshaken *samādhi* (concentrated contemplation), emerges out of this Vānaprastam forsaking all desires, and enters the Sanyâsam.

Sanyâsam, as has been pointed before, is a stage of action. But it may be asked whether any action is left when all action is abandoned. Desire is mercilessly annihilated. Perception of Diversity has been rooted out. Nay more. Intellect itself has been greatly modified. What action can remain under these circumstances? Verily all objective action ceases. Notwithstanding, transcendental action, or action on the subjective plane corresponding to the subjective faculties of the mind, does exist. That action which distinguishes not between the actor, the acted-upon, and the medium of action, does exist. That action wherewithal the actor laughs and weeps, kills and does not kill, enjoys and suffers, and in fact all the dual phenomena revealing themselves at one and the same moment—that kind of action does exist. That sublime, illustrious, and just action by which the seer always and in all things sees but himself—that action does truly remain. Not that because reason has been transcended consciousness does not exist, but, on the other hand, it now stands in all its pure brilliance identifying itself with Âtman, and radiating in such profuse splendour that a second does not exist. No; it is not true that reason has ceased to exist. Instead, leaving its more common nature of half-activity and half-indolence, it has passed into a highly active and most complex condition.

True Sanyâsam in modern phraseology is the perpetual living in the subjective condition of mind.

In all these four stages in the training of an individual, the ideal of Self-realization is constantly kept in view. The ideal includes the complete knowledge of Dharma and Brahma which is obtained only from the Vedas. The Vedas, therefore, cannot be what they are generally supposed to be.

## CHAPTER VI.

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### CORROBORATIVE EVIDENCE.

**T**HE Hindu Social organization—The Purânas and their general effect—A comparison of modern Scientific theory regarding human soul with that contained in the Purânas—The Dharmasâstras and their function—The origin of Varnas and their fundamental significance—The Declaration.

That the Hindus have a social organization that obtains in no "civilized" land, and that it has been the cause of their degradation, has latterly become a matter of undue notoriety. The sinister motives guiding up to this decision, especially when it originates from interested critics who unfailingly view things from in front of the curtain, are varied and numerous. Many have dared to ridicule and abuse this time-honoured social structure in terms that need not be repeated here; but few have had the courage and means by way of substantial facts to repress this motiveful vituperation. However, necessity has armed us with an outlook of a reflective and foreseeing nature, by virtue of which we have, at least partially, succeeded in drilling through the unfathomable layers of centuries past, with a view to draw to the surface those brilliant diamonds and emeralds which form the foundation stones of our national evolution. Has any one but the sage, who abides in the generous and hospitable forests, any idea of the nature and value of these radiating gems? Certainly not; for, otherwise, we would not have been in this dilemma of life and death. The present Hindu society seems to be in a remediless deadlock. Spurned by foreigners who know little of his civilization, mistrusted by his own kith and kin, over-ridden by famine and pestilence, and steeped in dishonour.

worse than death, the Hindu is seen living in a veritable nether-world indeed. Alas ! how shameful and cowardly on our part to silently bow to this regime of Adharma—we who are the children of the stately monarchs and almighty Rishis !

Our habits and customs, our ways and methods of civil and economic life, and in fact all institutions that are traced to Hindu civilization, appear to the ingenuous critic to be shambles of unprecedented horror, ignorance and barbarism. Had it not been for the deleterious hypnotism under whose influence we are living today, and which has not a little to do in giving them convenient opportunity for this malstatement, we could have doubtless maintained our own ground. Yet, even with all the impotence and misery of our position, we are commanding worthy reverence from their sober-minded brethren, is itself a sure testimony of our standing worthiness.

The social Dharma that our ancestors implanted among the diverse communities of Bharatavarsha, is what is herein called the Rājasa portion of our Heritage. Rājasa is the second of the three "Gunas" or phases of Nature, and is the main source of the mixed activity obtaining in our plane of existence. It is a mixture of the two other forces, the Satwa and Tamas, the one leading up to that indescribable activity of a Jñana Yōgi, the other dragging down to the equally inexplicable inactivity of the stone. In Hindu civilization the forces of Satwa predominate over the feeble but inevitable ones of Tamas, thereby for all practical purposes excluding individualistic tendencies ; and the consequence is that the Hindus have been supposed to be in want of manly (?) qualities such as retaliation and self-appropriation. The value and need for this department of our Heritage, lie in establishing concord and peace of mind among the various members of the community, by minimising the unhealthy

competition and the spirit of self-aggrandizement, which are eating the entrails of the modern Western civilization.

The literature relating to the social Dharma of the Hindus, takes its origin entirely from the Vedas. Eliminating the imaginative and consequently supposititious and arbitrary literature of latter times, which generally goes by the name of drama, poetry, and fiction, and setting aside the Vedas, Bráhmaṇas and Sūtras which chronologically belong to the most ancient days, we will be left with the *Dharma-sāstras* and *Purānas*, together with their interpretations and commentaries. There is not a *Dharmasāstra* or a *Purāna* that does not cite the Veda for its authority. This is but natural : there is not the slightest reason why we should not credit the Vedic Rishis and their followers, who had mastered the Principles of Nature inculcated in the Vedas, with having instituted the political, social and economic laws, which these works exclusively contain, for the weal of the society and guided by the conclusions of science, to live in compliance with which was their main endeavour and monopoly. To expect that the eminent men of science, when they have succeeded in formulating a standing theory that solves without leaving scope to any doubt whatsoever the intricate and abstruse problems respecting the nature and purpose of our existence, would, owing to their deep sense of justice and out of sheer compassion for their fellow beings, codify laws and rules which are the mere extensions of the Principles of Nature, so as to make the society act in obedience to them, is not a matter for wonder much less an untenable inference. When any custom or ethical principle is introduced into the society, it invariably comes from its intellectual giants; and the people who are aware of the capacity and powers of these personalities, would be the last

to refuse to adapt themselves to the scheme engineered by these leaders. The Mānava Dharma Sāstra is an instance to the point. It was the people who besought the celebrated law-giver to direct them in matters social and political.

The *Purānas* and the *Dharmasāstras* are not identical in substance ; but the purpose with which they were composed, that of incorporating the Principles of Science into the society by the dexterous use of an unmatched symbolic representation, is one and the same. What we find in the *Purānas* is a metaphorical—to be more exact, a real because it is natural and unconventional—description of the nature and properties of the Devas, the chemico-physical Agents of Nature, intermixed with an admirable exposition of the philosophical and moral doctrines and certain historical references. The necessity to clothe these scientific facts in a mythological garb, arises out of a desire to simultaneously achieve three purposes. In the first place, these works are so framed as to place before the intellectual eye of the Vedic student of this age of unbelief, an endless chain of sustained metaphor, the understanding of one of whose links, which in turn is made possible owing to the fact that we have interspersed in these links a number of statements that can have any meaning only when viewed at with the expectation of finding in them scientific facts and principles, would reveal to him the inner nature of the Vedas, and thus bestow on him the requisite courage and strength to carry on his researches into them. In the second place, the composer or composers of the *Purānas* intended to train up the engrossed minds of ignorant men and women towards an appreciation of cosmology and its forces, and show them more or less the same path as is followed by a man of Science in his search after Truth and the attainment of *Mōksham*. The last but not the least is a desire to perpetuate the Vedas

from generation to generation. It is the combined effect of these three motive forces that is manifesting itself in this end of the Kali Yuga—a time wherein we are daily witnessing the increasing mental unrest and the culminating conflict of ideals of the frail inhabitants of this planet, and the accelerated development of *sraddha* and *bhakti* engineered by Dharma for the overthrow of the dominant *āsurāmsa*.

The general effect of these *Purānas* on the masses of this country, is to eliminate the unhealthy and immoral competition in life for temporary and subordinate gain to the profit of co-operation and unity, simplicity and piety in the scheme of life. It will be easily seen that the part played by the *Purānas* in producing order and peace of the society, has undoubtedly been great, if only we bear in mind the many centuries through which the Hindu society has passed without appreciable change in the fundamental principles underlying its organization. This, indeed, is the direct result of the method adopted in their composition. It looks forward to the actual evaluation of the material, moral and spiritual states of man. Activities on the material plane are very often deprecated in these works as productive of attachment and necessarily unhappiness. On the other hand, a knowledge of the spiritual life and its mode of action are said to be conducive to our emancipation. It is further asserted that living in unison with the moral code would lead one to the right understanding of the laws relating to the spiritual life.

These statements which have received a great emphasis at the hands of the *Rishis*, are not without a strong rational support. To start with, it may be observed that the distinct specification of two seemingly antagonistic planes of existence, is thoroughly scientific. Sir Oliver Lodge, one of the distinguished scientists of the day, says:—"It is my firm

belief that science will shortly prove the definite survival of human life after death and the existence of a larger world which sways our thoughts and actions." Many other eminent men of science have, after a life-long study and patient research, subscribed to this doctrine. The difficulties in reconciling the ideas enumerated in the Purāṇas about the subjective world with those held by modern material scientists, are even now too many and appear quite formidable. But the time is fast drawing near, when the actual relation of the one to the other, will be as easily demonstrated in a physico-chemical laboratory as any of our common experiments. In fact, the Agents of Nature which will surely land us in this subjective plane of the universe, have already revealed themselves to the scientists in the form of rays of various denominations, but our scepticism has blinded us to the implications of these phenomena. The text,

Dēvasya.twā savitur prasavē'swinôrbâhubhyâm  
pûshnô hastâbhyâm pratigrihâmi,

which occurs at the beginning of the Rig Veda Aparaprakâsaka,—a work dealing with the rites and ceremonies performed when a man dies, *i.e.*, with experiments calculated to reveal the nature of the *apara* or the subjective phase of this manifestation,—gives us an idea, vague though it be, of the scientific basis of the spiritual life with which the ancient Rishis were acquainted. This text speaks of the origin and nature of the anode and kathode rays, and is taken from the Sukla Yajur Veda. From the context in the Aparaprakâsaka (the expounder of the subjective phase of Prakriti), one will understand how these rays are to be made use of in experiments that go to reveal the real nature of the subjective phase of the universe.



After all, what do the physical sciences say? Do they deny the existence of a thing or a law to detect which we do not possess enough means and material? Admittedly our scientists know very little at present, and it is wholly beyond their province to speak as though they knew everything.

Nor are the modern scientists unanimous in attributing every known phenomenon to the agency of matter and the known forces of Nature. There are two different schools among them, the materialistic and spiritualistic scientists. "To the materialistic scientist *physical nature conceals all that one would know of God or of his own Soul. Psychic phenomena alone reveal that knowledge*", observes Dr. Hudson. The old or materialistic psychologist had really gone far, but not far enough to answer whether or not there existed anything in man over and above his objective mind. He believed that the chemical change taking place in the grey matter of the brain, was the chief source of all thought, feeling, imagination and intelligence. He enumerated the five senses and the mind to be the sole components of the psychological man, and believed that the system known as man consisted of a few of the chemical elements of the material manifestation and nothing else. According to him there is no *Soul* in man, nothing that is omnipotent, omniscient and omnipresent.

But the Hindu psychologist of yore did not wholly subscribe to these views. He did believe, of course after due experimental investigation, that the human frame consisted of the elements of the Chemist, that there were five *Karma-indriyas* and five *Jñāna-indriyas*, and a brain composed of matter, the centre of thought, imagination and intelligence. But he did not stop there. He found that this hypothesis failed to explain the whole of the phenomena manifested by

man. He perceived that the chemical reactions taking place in the cerebral matter did certainly govern the faculties of man. But he also observed that man exhibited two distinct phases of consciousness, one during his wakeful state and the other during sleep. Further, the phenomena of hypnosys, telepathy, and mesmerism so widely practised among the Rishis of India, forced him to conclude that man was gifted with a dual mental organization. He termed them *manas* and *chitta* respectively. The latter is the abiding place of feelings and consciousness; the former consists of *Buddhi* (intellect) and *Ahañkāra* (objectivity).

"Listen, there are five indriyas (senses), *manas* (objective mind) the sixth, and *Buddhi* (intellect) the seventh. The eighth which governs all these is the *Kshêtrajña* (Jīva or Soul.)"

"Intellect is the support of knowledge and ignorance. That consciousness which is rich in the faculty of fully discriminating among the "That," "Thou," and the "I," is proclaimed Jīva by the Srutis."\*

The scientist's view of this Jīva is thus recorded in the Talavakara Upanishad (III. 1-12, and IV. 1-4.):—

"Brahman obtained the victory for the Devas. The Devas became elated by the victory of Brahman, and they thought 'this victory is ours only, this greatness is ours only.'

"Brahman perceived this and appeared to them. But they did not know it, and said: 'What sprite (Yaksha or Yakshya) is this?'

"They said to Agni: 'O Jātavēdas, find out what sprite this is.' 'Yes,' he said.

"He ran towards it, and Brahman said to him: 'Who are you?' He replied: 'I am Agni, I am Jātavēdas.'

"Brahman said : 'What power is in you ?' Agni replied : 'I could burn all whatever there is on earth.'

"Brahman put a straw before him, saying : 'Burn this.' He went towards it with all his might, but he could not burn it. Then he returned thence and said : 'I could not find out what sprite this is.'

"Then they said to Vâyu : 'O Vâyu, find out what sprite this is.' 'Yes,' he said.

"He ran towards it, and Brahman said to him : 'Who are you ?' He replied : 'I am Vâyu, I am Mâtarisvan.'

"Brahman said : 'What power is in you ?' Vâyu replied : 'I could take up all whatever there is on earth.'

"Brahman put a straw before him, saying : 'Take it up.' He went towards it with all his might, but he could not take it up. Then he returned thence and said : 'I could not find out what sprite this is.'

"Then they said to *Indra* : 'O Maghavan, find out what sprite this is.' He went towards it, but *it disappeared from before him.*

"Then in the same space (ether) he came towards a woman, highly adorned : it was Umâ, the daughter of Himavat. He said to her : 'Who is that sprite ?'

"She replied : 'It is Brahman. It is through the victory of Brahman that you have thus become great.' After that he knew that it was Brahman.

"Therefore these Devas, viz., Agni, Vâyu, and Indra, are, as it were above the other Devas, for they touched it (the Brahman) nearest.

"And therefore Indra is as it were, above the other Devas, for he touched it nearest, he first knew it.

"This is the teaching of Brahman, with regard to the Devas : It (Indra) is that which now flashes forth in the lightning, and now vanishes again."

It is evident from this description that the ancient *Rishis* enquired whether the chemico-physical Agents of Nature, such as oxygen, hydrogen and electricity, were the main source of this manifestation, or there existed anything else. The answer given in the above passages, is that these chemico-physical Agents of Nature hold a subordinate position in the drama of manifestation, the director being Brahman, or *Âtman*, whom electricity "touches nearest." Indra, that is, electricity, gives out the secret surrounding the Brahman. He enquires *Umâ*, which signifies negative electrification, who gives the answer. Note also that *Umâ* is here represented as found in ether. Electrons are but particles of ether-energy. It is these electrons that reveal the ultimate reality.

Elsewhere we read: "Indra said to him (a *Rishi*): 'Know me only; that is what I deem most beneficial for man, that he should know me. I slew the three-headed son of *Tvashtri*;.....And not one hair of me was harmed there. And he who knows me thus by no deed of his is his life harmed, not by the murder of his mother, not by the murder of his father, not by theft, not by the killing of a *Brâhmana*. If he is going to commit a sin, the bloom does not depart from his face.'

It is here meant that a knowledge of the real nature of electricity is all that is desirable: it is the ultimate goal of all knowledge, and the person who is in possession of this knowledge, has the means to know Brahman or *Âtman* at his command and thus attain eternal bliss.

There is thus an entity, known as *Âtman*, which is different from any or all of the chemico-physical Agents of Nature. It is to this *Âtman* that the term subjective mind is applied by the modern spiritualistic scientists.

It is neither impertinent nor unscientific to uphold this

classification, which the Hindus are accustomed to do. Recent advances in psychology have brought to light practically the same thing. The study of mind has offered a great resistance, the like of which no other phenomenon or principle of Nature had ever given rise to. It is still but a partially accomplished task. The materialistic scientist has been content with the partial study of the "objective mind". But the times, however, have produced true scientists who do not shrink from investigating into any kind of phenomena, whether of the physical universe or psychic force. To such is due the credit of having restated that human mind exists in two phases, objective and subjective. The investigation of psychic phenomena, such as telepathy and hypnosys, undertaken by men of the stamp of Rev. Minot J. Savage, of Boston, and F. W. H. Myers, of London, who are "gentlemen whose reputation for learning and scientific attainments and for candour and transparent honesty of purpose is as wide as civilization," have enabled Dr. Hudson to postulate three propositions: namely,

"(1) Man is possessed of a dual mind—objective and subjective,

"(2) The subjective mind is constantly amenable to control by suggestion,

"(3) Telepathy is a power of the subjective mind."

"The objective mind takes cognizance of the objective world. Its media of observation are the five physical senses."

"The subjective mind takes cognizance of its environments by means independent of the physical senses. It perceives by intuition. It is the seat of the emotions, and the storehouse of memory. It performs its highest functions when the objective senses are in abeyance. In a word, it is

that intelligence which makes itself manifest in a hypnotic subject when he is in a state of somnambulism."

Professor Draper in his "Conflict between Religion and Science" defines "subjective intellect" thus:—"The individual or passive or subjective intellect is an emanation from the universal, and constitutes what is termed the Soul of man." On this Dr. Hudson remarks:—"This perfectly expresses my belief regarding the subjective mind. It not only possesses powers and functions which act independently of those of the objective mind, but its very manifestation shows it to be a distinct entity, and apparently capable of maintaining *an existence independently of the body*. It is a spark of the Divine Intelligence. It is the Soul."

The manas, buddhi, and ahañkāra of the Hindu psychologist are now called the objective, and chitta the subjective mind. Chitta is also known as the Jīva or the Soul. Chaitanya is the nature of the Jīva. "He, the highest Person, who is awake in us while we are asleep, shaping one lovely sight after another, that indeed is the Bright, that is Brahman, that alone is called the Immortal. All worlds are contained in it, and no one goes beyond. This is that." We have also a verse in the Mahābhāratam, which when rendered into English reads thus: "Prakriti assumes consciousness by reason of its union with Purusha. From this results intellect which gives rise to ahañkāra (engendering objectivity) that binds the chitta." The Hindu infers from this that the Purusha or the chitta is different from the consciousness which man displays during his wakeful state. The latter is the property of the union of Prakriti and Purusha. This Purusha or chitta is a part and parcel of Ātman, the universal subjective mind.

More light is thrown on the nature of the two minds by

the following propositions enunciated by Dr. Hudson.

1. "Each of the two minds possesses powers and functions which are not shared by the other." This is the reason why the Purāṇas declare that the knowledge of Puruṣa cannot be gained even by the study of the Vedas (the principles of the exact sciences). Only through Yōga can it be achieved.

2. "Each of these two minds is hedged about by limitations not shared by the other." This is the idea involved in the Purāṇic declaration that Jīva has a *linga-sarīra* which differs from the physical one. The five *karma-indriyas* are the exclusive property of the *sthūla-sarīra* or the physical body, while the *jñāna-indriyas* are in the possession of *buddhi* or the objective mind. Chitta stands apart alone and self-sufficient, and yet it is spoken of in the Purāṇas as having an etherial body. The term *linga-sarīra* should on no account be mistaken for an actual body. An actual body is always associated with senses (*indriyas*), whether fully manifest or not, performing definite functions. All that the word *linga-sarīra* connotes is that, in order to attribute a specific existence to the Puruṣa or chitta, differing from the rest that surrounds it in the body, we may safely assume a limitation to it. The opinions of the Hindu philosophers diverge at this point. The Viśiṣṭa Advaitis believe that the subjective minds of different individuals are different among themselves and from the universal Soul, while the Vēdāntins abhor this view, and "see" the one universal Soul in all beings. The latter further state that the Ātman is omnipresent being the same both in and out of the bodies. It is the indivisible entity.

3. "These powers and limitations are divided into three distinct classes; namely,—

- (a) Those which belong exclusively to the objective mind;
- (b) Those which belong exclusively to the subjective mind;
- (c) Those which are common to both minds.

4. "Those which belong to class (a) pertain exclusively to physical life and environments.

5. "Those which belong to class (b) perform no functions whatever in physical life, and are observable only under abnormal physical conditions.

6. "Those which belong to class (c) are more or less imperfect—finite—in their manifestations in the objective mind, whereas *each faculty is perfect in the subjective mind.*"

"Thus we find man," proceeds Dr. Hudson, "as he is presented to us in the light of demonstrable facts, possessed of a dual mental organism, comprising two classes of faculties, each complete in itself.

"We find one class of faculties to be finite, perishable, imperfect, and yet well adapted to a physical existence and a material environment, and capable of development, by the process of evolution, to a high degree of excellence, morally, physically, and mentally, within the limits of its finite nature. We also find that the noblest faculties belonging to physical man—those faculties which alone render his existence in this life tolerable or even possible, those faculties which give him dominion over the forces of physical nature—are faculties which pertain exclusively to this life.

"On the other hand, we find another set of faculties, each perfect in itself, and complete in the aggregate,—that is to say, every faculty, attribute, and power necessary to con-



stitute a complete personality being present in perfect and we find that the most important of those faculties perform no normal function in physical life."

It is this personality that is called in the Purâṇas and elsewhere the Pitri. The subjective mind of the universe is the sum total of these Pitris.

This and more than this has been preached by the Purâṇas: and since the Purâṇas have drawn their theme from the Vedas, it is right to say that the latter do but contain the facts and principles of the exact sciences.

Of the three departments of Social Dharma recorded in the Purâṇas, a few principles of its spiritual branch have here been dealt with. Very little of the strictly social Dharma is incorporated in them, inasmuch as it is elaborately discussed in the Dharmasâstras. But that relating to the ethical side has received a singular prominence. Emphasis is placed on this item of their teaching, since a rigid adherence to its code is essential for the proper understanding of the spiritual life. It develops *sraddha* in us. Of *sraddha* it is thus remarked in the Mahâbhârata: "*Sraddha* is the daughter of the illuminor (Jîva). It develops intellect, widens outlook, and bestows happiness. Its nature is to purify the mind. The wise reckon it as the chief quality of the Purusha". "Listen, O best of *Munis*, the wealth of *sraddha* protects the actions of both the tongue and mind. Verily, *sraddha* is the brilliant radiance of the Jîva itself."

There need be no doubt about the utility of the moral dicta advocated in these works for the reason that they are framed by those intellectual giants, who had broken the barriers of material and spiritual entanglements, and had actually seen the other side.

The Dharmasâstras, though numerous, are all similar in character. Being later than the Vedas, and as they were intended for common folk in order that they may promote peace and order, they were written mostly in plain and unfigurative language quite different from that of the Vedas. They all take their source from the Vedas, the aggregate of scientific knowledge. This is acknowledged by the author of the Mânava Dharmasâstra, by far the most important work of the class, when he says that "The roots of the Law are the whole Vedas (Samhita and Brâhmaṇa), the customs and traditions of those who knew the Veda, the conduct of good men, and one's own satisfaction."

This confession, coupled with the fact that the Vedas are scientific records, would give them their exact individuality of training men to be scientifically good, that is to say, to act in obedience to the laws of Nature and their logical extensions. Hitherto, the idea that these ancient works on law represented the attempts of a primitive race at establishing a society according to their crude notions of the material and moral life of man, had been oppressing our spirits. But now that, in virtue of the imperceptible workings of time, we have realized the actual nature and value of the Vedas, such statements, to say the least, do not deserve attention. Our widened outlook has gathered evidence which gives us courage to declare that these sâstras have originated, though perhaps indirectly, from the Vedic Rishis, the giant scientists. The Hindu Dharmasâstras, as they are handed down to us, possess the most essential extensions of the natural laws to be applied in the case of social beings, and hence they are not in the least conventional. Whereas the laws prevailing now in Western countries, are the result of the play of passion, covetousness and spirit of

aggrandizement and misappropriation of the human mind. With this gulf between them, it is but natural that the two are never found to agree. Men of virgin reason would take their stand with the advocates of the former.

Unlike the law codes of our day, whose jurisdiction does not extend beyond the material and moral spheres of human action, these Dharmaśāstras contain regulations which direct the spiritual life and beyond it too. Manu says :—

“The Soul is the assemblage of the gods. The universe rests in the supreme Soul. It is the Soul that accomplishes the series of acts emanating from animate beings.

“The Brāhmaṇa should figure to himself the great Being who is the Sovereign Master of the universe, and who is subtler than an atom, as more brilliant than pure gold, and as inconceivable by the mind, except in the repose of the most abstract contemplation.

“So the man who recognizes the supreme Soul as present in his own soul, understands that it is his duty to be kind and true to all, and the most fortunate destiny that he could have desired is that of being finally absorbed in Brahman.”

Being written with these ideals in view, these works can hardly be other than storehouses of justice.

The rules and laws laid down in connection with transactions, offences and other social matters, though extending over a fairly good length of these works, are, yet, subordinate and subservient to those relating to spiritual conduct. True, there are ordinances providing for severe punishments, merciless excommunications, and rigid adherence to the Brāhmaṇical order—not as it is now when birth has taken the place of merit,—but to suppose them to have originated out of malice, ambition, and jealousy on the part of their

authors, is no less than a blunder, and points to a lack of scientific thought on the part of the critic. Unless punishments are severe, how can the concordance found among the Laws of Nature be obtained? And why law after all if it only pretends to preserve order and peace?

The arresting problem of Varnas which these works treat of in elaboration, affords yet another proof of the fact that the Vedas are scientific works. The reactions taking place in Nature, establish definite relations among its various components. These relations are universal and immutable, that is, under the same conditions the same reactions take place, irrespective of time and place. Some of these relations are of a greater value and deeper significance than others, and consequently, require, for being comprehended, a greater capacity for application, study, and effort on the part of the student. Naturally, therefore, the relative importance of these relations, from the point of view of their profundity and capability to further our knowledge of the fundamental principles of Existence, forms the basis of a systematic demarkation of the various components of Nature. And it is a simple truism that a man is what he knows. A man who is conversant with the profounder relations existing among the Agents of Nature, occupies a more advanced position in the course of evolution, than one who is acquainted with only the more common-place Laws in Science. Now, then, the person who knows everything about that category of objects of Physical Sciences which would fill the last rank when the above referred systematic demarkation is effected, must occupy, if our valuation is to be intrinsic and fundamental, such a position in the scale of society that all others who know anything about the other categories of objects of Physical Sciences to boot, shall be

his natural superiors. In consonance with this procedure, the society may be divided into as many classes as there are different categories in the schedule of demarkation. Such a social organization will be spoken of as being based on the very Laws of Nature, or Dharma; and the actions of the members of that society will invariably be regulated by the analogies afforded by the members of Dharma.

Such, indeed, had been the origin of the Hindu organization of Varnas. We read in the *Bṛihadâraṇyaka Upanishad*\* thus:—

“Verily in the beginning this was Brahman, one only. That being one, was not strong enough. It created still further the most excellent Kshatra (energy or force), *viz.*, those Kshatras among the Devas,—Indra (electricity), Varuṇa (oxygen), Sômâ (alcohol), Rudra (radioactive matter), and others. Therefore there is nothing beyond the Kshatra, and therefore at the Râjasûya the Brâhmaṇa sits down below the Kshatriya. He confers that glory on the Kshatrîya alone. But Brahman is (nevertheless) the birth-place of the Kshatra. Therefore though a king is exalted, he sits down at the end (of the Râjasûya) below the Brâhmaṇa, as his birth-place. He who injures him, injures his own birth-place. He becomes worse, because he has injured one better than himself.

“He was not strong enough. He created the Vis (those which pervade), the classes of Devas which in their different orders are called Vasus, Rudras (rays from radioactive matter), Âdityas, Visvêdêvas (the products of oxidation of alcohols), Maruts (the Kathode and Anode rays).

“He was not strong enough. He created the Sûdra class, as Pûshan (as nourisher). This earth verily is Pûshan

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\*I. 4, 11-14. Translated by Max Müller, the bracketed words being ours.

(the nourisher) ; for the earth nourishes all this whatsoever.

"He was not strong enough. He created still further the most excellent Dharma. Dharma is the Kshatra (power) of the Kshatra, therefore there is nothing higher than Dharma. Thenceforth even a weak man rules a stronger with the help of Dharma, as with the help of a king. Thus Dharma is what is called the true. And if a man declares what is true, they say he declares Dharma, and if he declares Dharma they say he declares what is true. Thus both are the same.

"There are this Brahman, Kshatra, Vis, and Sûdra. Among Devas that Brahman exists as Agni only, among men as Brâhmaṇa, as Kshatriya through the Kshatriya (who knows about the Kshatra), as Vaisya through the Vaisya (who knows about the Vis), as Sûdra through the Sûdra (who knows about the Sûdra). Therefore people wish for their place among Devas in Agni only ; and among men in Brâhmaṇa, for in these two forms did Brahman exist."

The actual considerations that directed the Rishis of India in defining the nature and scope of the organization of Varnas, are succinctly set forth in the foregoing remarks. We have already remarked\* that this classification is characterized by a thorough scientific method of argumentation and clear insight into the fundamental laws governing the reactions of the Agents of Nature, and that the sequence mentioned in the above enumeration is, therefore, a natural and the only possible and valid one.

Thus, then, does Brahman or the subjective Principle of the universe top the list. Next comes energy (Kshatra) followed by the offsprings of energy (Vis), which pervade the manifestation, and the serviceable manifold manifestation.

The Rishis of India have found in this intrinsic demarkation the necessary data for a similar classification of human individuals. They say that, inasmuch as among men Brahman exists as Brâhmana, the Brâhmana must needs be one who knows Brahman, that is to say, who knows all the phenomena and Laws of Nature. This is the reason why the remark is made that,

“ Everything that exists is in the power of Devas,

“ The Devas are in the power of mantras,

“ This mantram is in the possession of the Brâhmanas,

“ Therefore, the Brâhmana is my god.”

The significance of this verse is that we must consider him a Brâhmana who knows all about the objects of the Physical Sciences and the relations existing among them. But he who has the knowledge of only the objects of the last three categories of the foregoing enumeration, can only be a Kshatriya ; the two latter only, a Vaisya ; and the last only, a Sûdra.

The qualifications and duties of these four grades of human beings are accordingly determined. The person who desires to be a Brâhmana should know the essential facts of all sciences, and should, guided by his knowledge, direct the activities of individuals and societies. A Kshatriya is he who has equipped himself with the necessary knowledge to understand and follow the Brâhmana, and detect and remedy the omissions and commissions of his inferiors, and who is specially conversant with the sciences dealing with the forces of Nature and their utilization during war. A Vaisya is one who has acquired a thorough knowledge of the sciences of Chemistry, Physics and such others, which are essential for a man to play the rôle of a successful industrialist, who forms one of the stable factors contributing to the wealth and prosperity of a nation. Lastly, the Sudras are

to acquire the requisite knowledge which enables them to undertake the duties of a practical husbandman, producing all the raw materials that are needed by the community.

Many Dharmasāstras were written in days of yore expounding this remarkable theme. A reference to them will make plain this and much more. For instance, the duties of the four Varnas mentioned above, involve certain relations among the members of a society, and their enunciation also, therefore, forms part of Dharma. The notion that the justice which these laws dispense must be as equanimous, equitable, and scrupulous as that of Nature itself, is a dominant feature of these works; and together with other conceptions recorded in them, which cannot be explained save by admitting the prevalence of quite a deep scientific knowledge in those far back times, it conveys to us that the term Dharma occurring here is the same as the one used to designate the Laws of Nature.

The actual working of this organization in ancient days was productive, beyond a doubt, of harmonious results, such as, peace, order, contentment, and happiness. Later on, however, as Bhakti and Sraddha got impaired and as decay set in, the extent of scientific knowledge gradually diminished ultimately vanishing into nothing. This gave rise to the invention and consolidation of the modern caste-by-birth system. Cowardice and fear, the natural accompaniments of ignorance, have greatly helped the fixation of the rigidity of this system. The Brāhmaṇa-by-birth, becoming conscious of his impotence to experimentally demonstrate his superiority over the other Varnas, since he had lost the scientific instruction that was in possession of his ancestors, who, unlike him, were not desirous of dignity and



position as they knew their ins and outs thoroughly, obstinately insisted on the Varna-by-birth. The powers and courage of the challengers of this untoward assertion, were weak: the result was that the continuation of this mutilated system was all the more oppressively enforced.

Now, however, the real nature of the Vedas is known, there is no further need of this caste-by-birth system. Confusion has already been set up in the society owing to a number of causes, of which the chief is that, due to Varna-saṅkaram, some natural Brāhmanas have taken their birth in Varnas other than the Brāhmana. The fight is progressing between the Brāhmana-by-birth and the Brāhmana-by-merit, with the one palpable result of producing more true Brāhmanas than were available hitherto in the Hindu society.

Out of this conflagration will arise Kalki Purusha as does fire from friction, and will fight out this battle to a finish. Krishna says:—

“Whenever, O Bhārata there is decadence of Dharma and prevalence of Adharma, I always incarnate myself.

“For the protection of the good, for the extirpation of evil doers, and for the establishment of Dharma, I am born from age to age.”

After at length describing what corresponds more or less to the present condition of the world, Mārkaṇḍeya\* makes the following *Declaration*: “When in this way all Dharma dies away, there will occur, at the termination of the Kaliyuga, many public calamities to the utter distress of the people. Then Vishṇu, incarnating himself at the well-known Sambala as Kalki, will, by the mere recollection, understand the Vedas (physical sciences) and acquire all the astras and Sastras, and assisted by wise scientists,

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\* The Mahābhārata.

will destroy the unrighteous *Mlêchhas*. He will then establish Dharma and perform the Aswamedha.

May this attempt be sufficient to generate the sacrificial fire of *Sraddha* and *Bhakti*, out of which Kalki will emerge consuming the bombastic nonsense of the learned investigators.

Ôm tat sat.

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